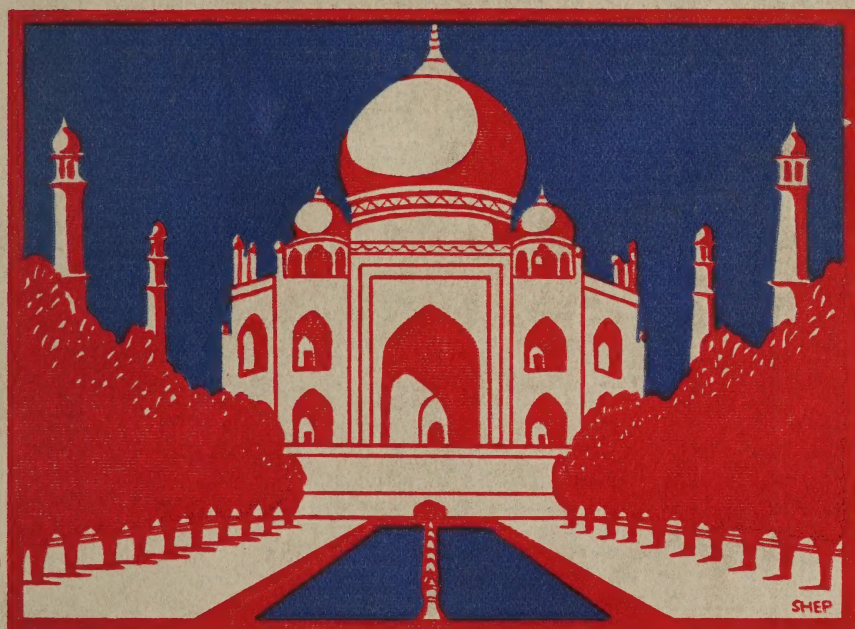


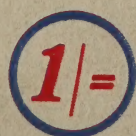
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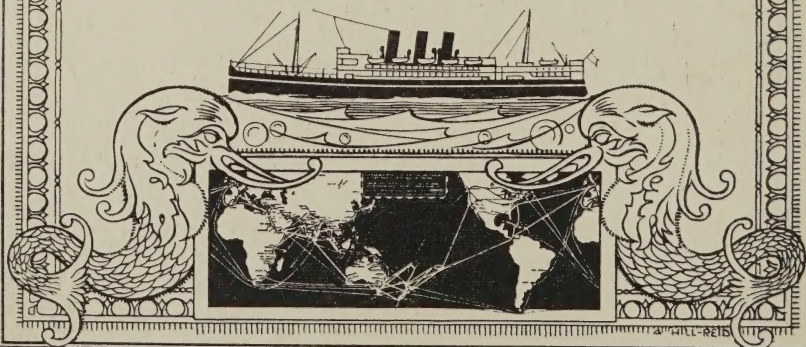
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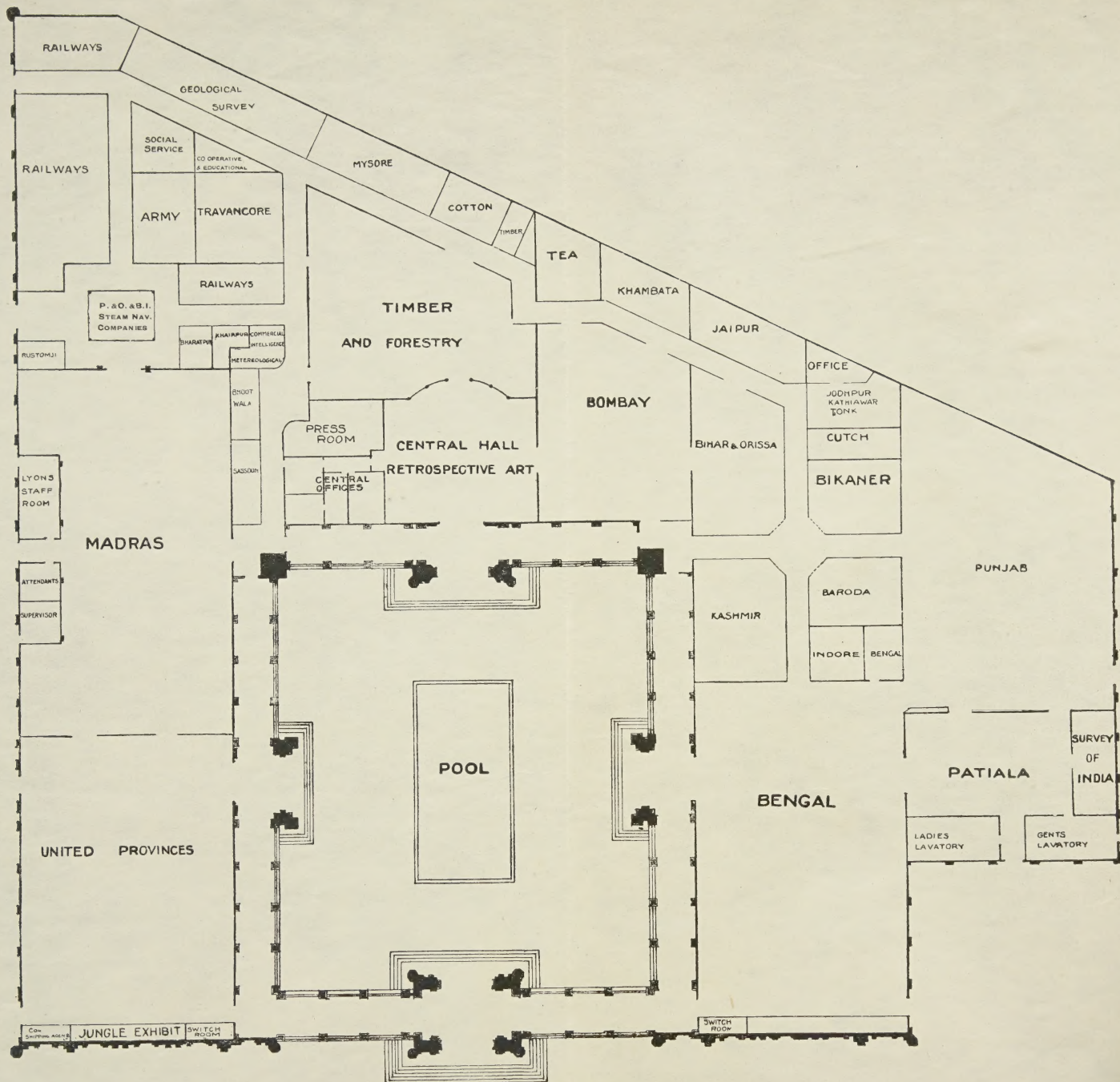
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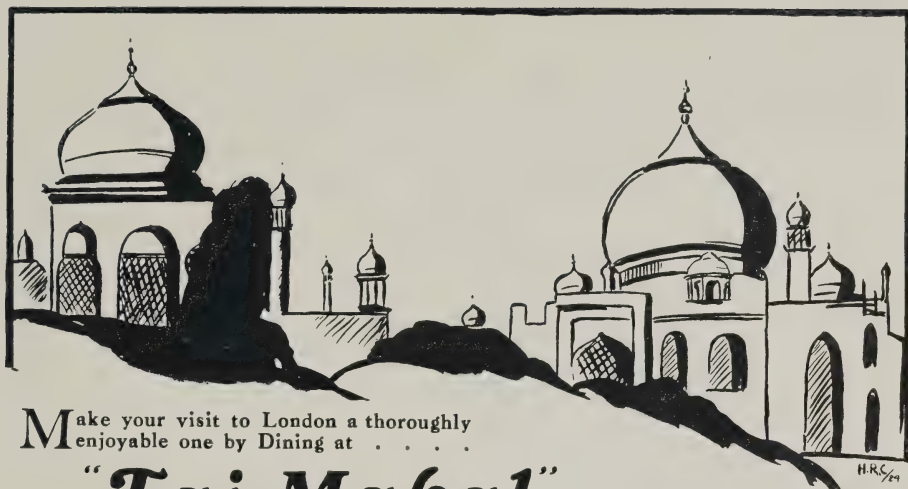
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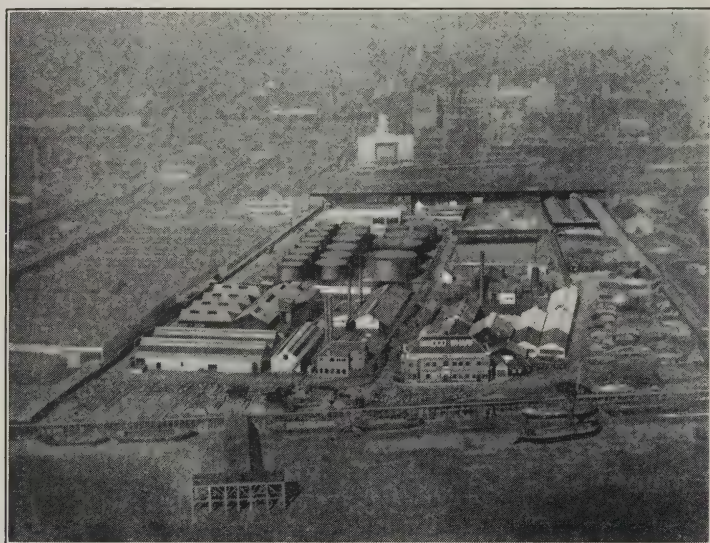
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THE INDIAN BUILDING

THE Indian building at the British Empire Exhibition at Wembley is erected on a rectangular piece of ground measuring 402 ft. on the north side and 450 ft. on the east, which is the main frontage facing the lake and grounds.

What may correctly be called the garden façade is 350 ft. long.

In the centre of this is the Entrance Gateway, 42 ft. wide, 35 ft. deep and 70 ft. high. There are slender towers and minarets at each corner, and the whole is crested on both faces by a row of small arches and domes, similar to those on the Victory Gate at Fatehpur-Sikri.

Leading right and left from this Gate-House is an open colonnade 16 ft. wide, with columns placed every 16 ft. 3 ins. apart, connected with arches. The colonnade continues in a cloister-like form right round the large open court—150 ft. wide and 167 ft. long, in the centre of which is a pool 40 ft. wide by 80 ft. long, with raised moulded parapet and fountains down the centre.

The North, South and East sides of this court are broken in the centre by large arched gateways leading to the galleries of exhibits of the various Indian Provinces and States. That on the East side may be described as the Main Entrance.

Over the large arch runs a gallery and balustrade with cresting over. It has lotus capped minarets at each corner and is surmounted by a large dome in form and proportion as the central one of the Taj Mahal at Agra.

At each end of this Eastern façade are octagonal towers 111 ft. high, capped and crowned with open lantern-like tops.

The style of Indian architecture chosen for the building is that which is commonly known as "Moghul." It embraces all buildings erected by the Indian master builders under the Moghul dynasty from its foundation by Baber in 1526 down to the 18th century, although Moghul architecture can hardly be said to have commenced until the founding of the present city of Agra by Akbar in 1558.

The whole building does not claim to be a direct copy of any special one but all its forms, details and proportions are drawn from the most celebrated of them.

The columns and arches of the Court are based on those at the Diwani-Khas at Agra.

The wing pieces of the front façade are suggested by the Khas Mahal, Agra.

The interior of Colonnade is somewhat like that in the Moti-Musjid (Pearl Mosque), Agra.

Details of entrance archways are to be seen at Ajmer, Jumma Musjid, Delhi and Fatehpur-Sikri.

Crestings : Pearl Mosque, Delhi.

The large towers are similar to those of the Golden Mosque, Lahore.

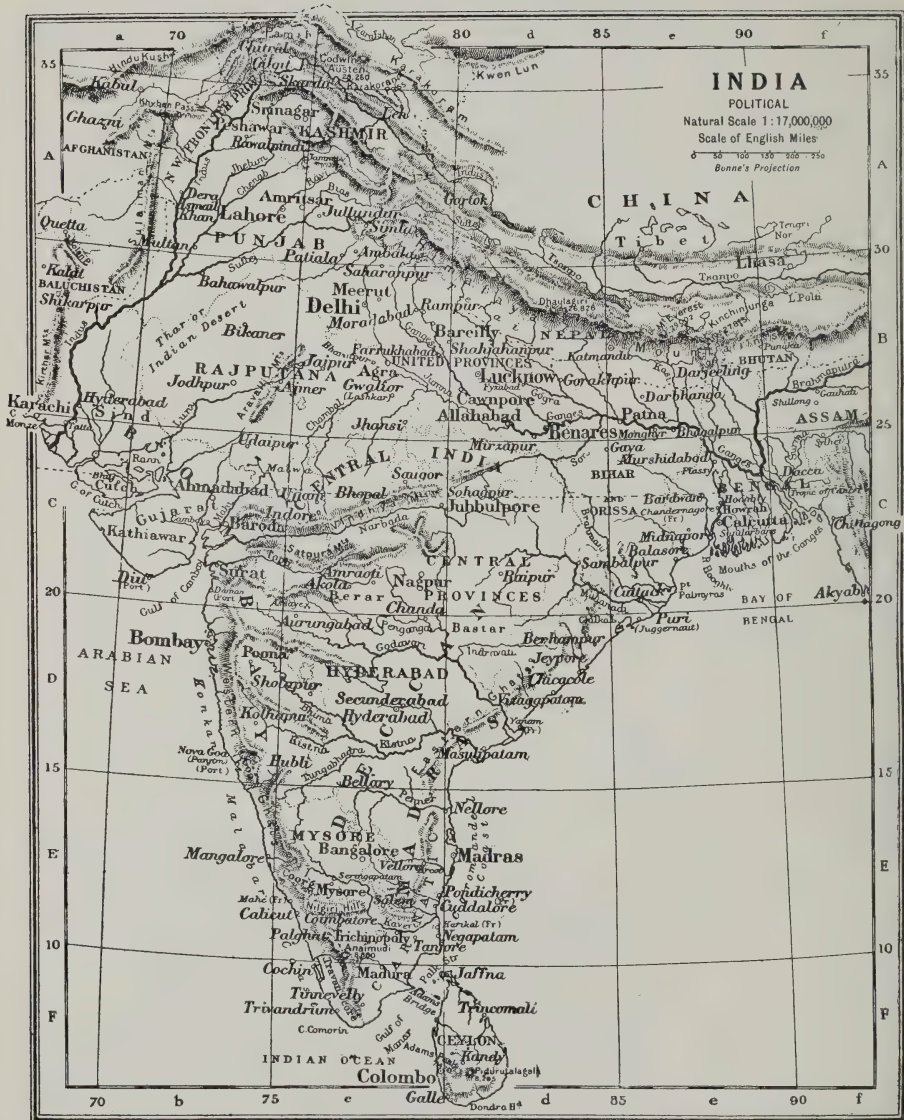
Pieces of earlier ornament are introduced here and there. The lotus bud and flower terminate the centre points of all arches and its inverted petals crown the dome and minarets.

29 May '26



PHOTOGRAPH OF INDIAN BUILDING

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MAP OF INDIA

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NOTE

The States of Cochin, Banganapalle and Sandur are exhibiting in the Madras Court.

The States of Benares and Rampur are exhibiting in the United Provinces Court.

The State of Kapurthala is exhibiting in the Punjab Court.

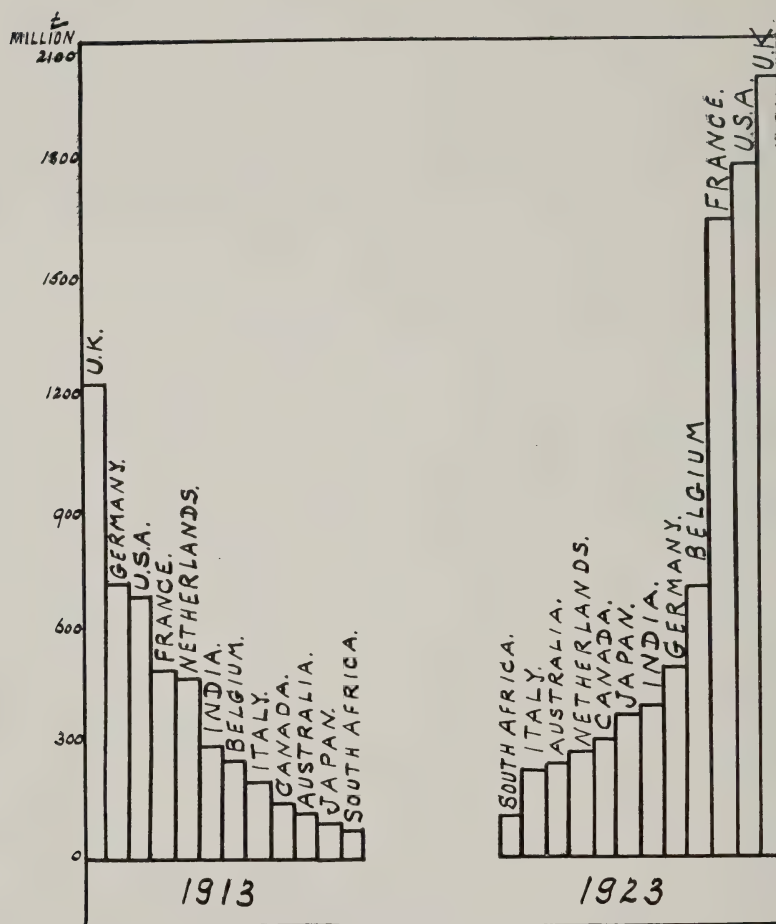
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SOME FACTS ABOUT INDIA'S TRADE.

(By H. A. F. Lindsay, C.B.E., I.C.S., Indian Trade Commissioner.)

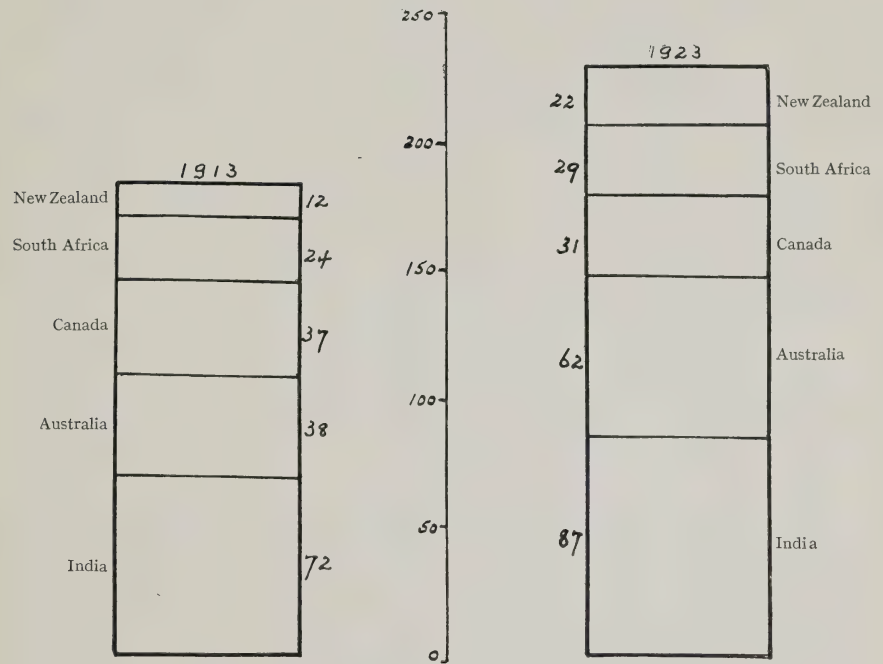
I. THE WORLD'S TRADE.



This diagram compares the total trade, import and export combined, of each of the twelve principal countries of the world in 1913 and again in 1923. The 1923 figures are not in every case available and in some instances it has been necessary to substitute the 1922 figures. The values are given throughout in sterling and the blocks have been drawn to scale.

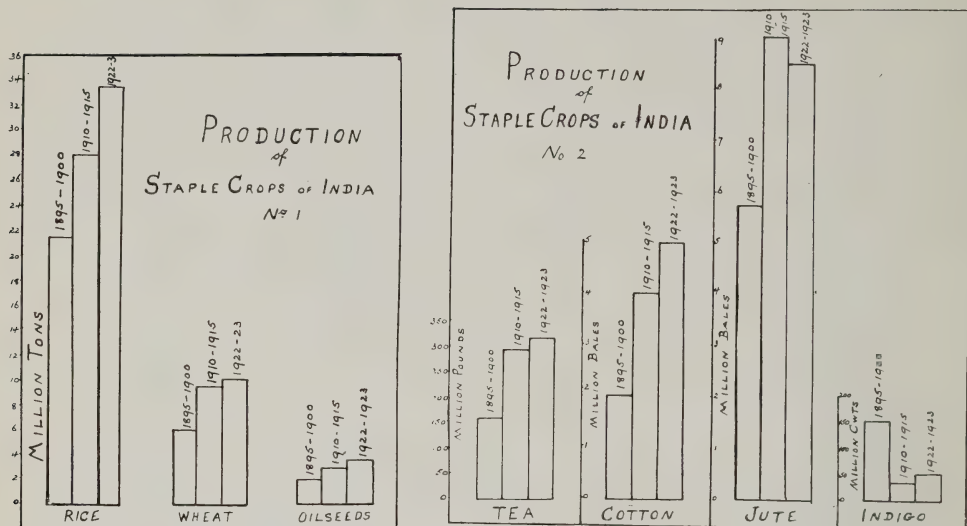
The Big Three trading countries of the world were in 1913 the U.K., Germany and the U.S.A., with France running a poor fourth. In 1923 France has attained to third place, and the Big Three are now the U.K., the U.S.A. and France, with Belgium a poor fourth and Germany fifth. India was sixth in 1913 and remains sixth in 1923. The biggest jump has been made by Japan, from eleventh place to seventh. Canada, Australia and South Africa were respectively 9th, 10th and 12th in 1913, and are now 8th, 10th and 12th. It is not usually realised that India holds so important a place as sixth in the order of precedence of the world trade.

II. EXPORTS FROM THE UNITED KINGDOM TO THE DOMINIONS AND INDIA.



This diagram compares the exports of the U.K. to the Dominions and India in 1913 and again in 1923. It shows the large and increasing importance of India as a market for British goods. If you compare the Indian market with the markets of New Zealand, South Africa, Canada and Australia, you will see how much larger are the purchases of British goods by India than by any one of the four Dominions. Purchases by India increased from £72,000,000 in 1913 to £87,000,000 in 1923. The market of next importance is that of Australia, which increased its purchases of British goods very largely, from £38,000,000 in 1913 to £62,000,000 in 1923, but still buys less from the U.K. in 1923 than India did ten years ago.

III. PRODUCTION OF STAPLE CROPS OF INDIA.

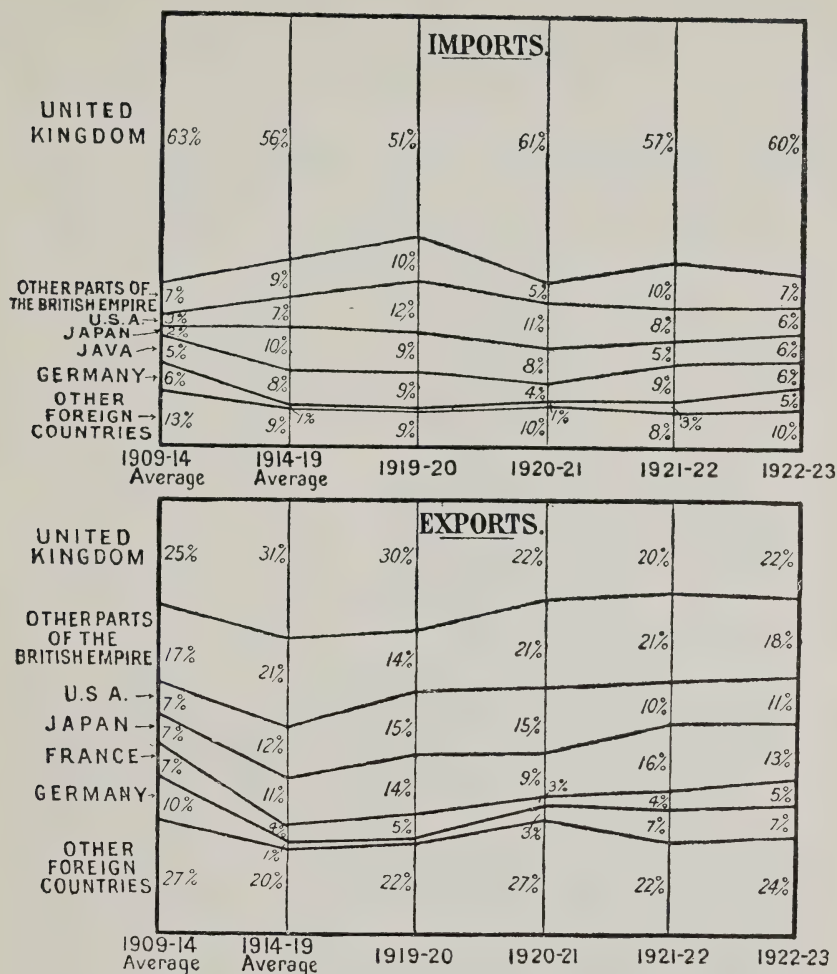


We now examine some of the staple commodities which India produces and exports. It should be explained that during the past fifty years there have been many changes in the staple exports of India. If one turns up the records of Indian exports during the seventies, one finds that cotton and opium then competed for first place. Cotton is still India's premier export, but in the interests of humanity and in order to discourage abuse of the drug, the production and export of opium have been greatly reduced. Indigo and lac dye were in the seventies important items in India's export trade. Both of these natural dyes have suffered from the competition of synthetic dyes.

The diagram shows developments in the output of India's staple products since the end of last century. The three blocks represent, for each commodity, the output in 1875-1900 (average), in 1910-15 (average) and again in 1922-23. Rice is grown in India on a gigantic scale, chiefly for local consumption, and production has increased steadily with the growth of the population. Wheat is chiefly grown in Northern India, where its superiority to other food-grains is increasingly recognised. It is estimated that the local consumption of wheat in the Punjab and other provinces of the north amounted to about 8,000,000 tons a year immediately before the war and is now about 9,000,000 tons. This growing popularity of wheat is to some extent due to the use of wheat flour as an army ration for the forces recruited in Northern India during the war. Oil-seeds are extensively grown, partly for export, but chiefly for local consumption.

Tea, which had a bad time in 1920, is now doing well. The output of 311,000,000 pounds in 1923 is not nearly so high as the output during the war, but on the other hand, plucking is now more carefully carried out and the average quality is better than it was. The production of cotton has responded to the stimulus of high prices since the war. This season's crop exceeds 5,000,000 bales, of which roughly one half is exported and one half consumed by the Indian mills. Jute is also an important crop, used chiefly in the manufacture of sacks. The official estimate of last season's crop was only 5,500,000 bales, but jute companies regard this as an under-estimate and consider 8,500,000 bales to be nearer the mark. The decrease in the output of indigo, as already explained, is due to the competition of synthetic Indigo. India now exports her natural Indigo dye chiefly to Mesopotamia, Persia, Egypt and Japan.

IV. DIRECTION OF INDIA'S TRADE.



This diagram shows how India's trade is distributed and shows also variations in that distribution during the pre-war period, the war period, and during four subsequent years. To take imports first. Before the war 63 per cent. of India's total imports came from the U.K. and the percentage is still much the same, namely, 60 per cent. Purchases from the Empire as a whole account for 67 per cent. of the total import trade. America and Japan both send large quantities of goods to India and are keen competitors for second place, after the U.K. Before the war, only 3 per cent. of India's total imports came from the U.S.A. and only 2 per cent. from Japan. During the war Japan made great progress in her trade to India and actually increased her percentage to 10. The quality of Japanese goods, however, was not always satisfactory and during the post war boom considerably more goods were bought from America than from Japan. Last year America and Japan tied for second place, with 6 per cent. each. India is a large importer of sugar from Java, and last year in view of the high price of sugar Java also claimed 6 per cent. of Indian imports. Before the war, 6 per cent. of Indian imports came from Germany, whose trade to India has steadily increased since the war and now stands at 5 per cent. of the total.

On the export side the U.K. does not figure nearly so largely as she does on the import side. At the same time, England is the largest individual purchaser, taking 22 per cent. of India's total exports. Other parts of the Empire take 18 per cent., chiefly jute goods, tea and rice. Here again, America and Japan are in competition, the latter taking 13 per cent. and the former 11 per cent. Before the war they each took 7 per cent. of the trade. Germany took 10 per cent. of India's exports before the war and now takes 7 per cent.

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AND FROM

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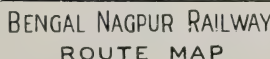
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East Indian Railway

RAILWAYS

THE first railway to be opened in India was a section of 21 miles from Victoria Terminus, Bombay, to Thana, on the 18th April, 1853, or 28 years after railways were first started in England. This now forms part of the Great Indian Peninsula Railway. The first railway company to be registered, however, was the present East Indian Railway in 1849, although the first section (Howrah to Hooghly, $23\frac{1}{4}$ miles) was only opened on the 15th August, 1854. Since then railways have greatly increased, and on the 31st March, 1923, there were 37,618 miles open in India and Burma.

Unlike railways in England, there are three different gauges in India—the broad (5 ft. 6 ins.), the metre (3 ft. $3\frac{3}{8}$ ins.), and the narrow (2 ft. 6 ins. and 2 ft. 0 ins.) gauges. About 18,389 miles are broad gauge, 15,508 miles metre gauge, and 3,721 miles narrow gauge.

Most of the narrow gauge lines act as feeders to the broad and metre gauges, and are also used in hill districts. Photographs will be found in the Railway Court showing how these narrow gauge lines wind in and out of the hills, and how sometimes three different levels of the railway are found on the same hill side as on the Kalka Simla Railway, and how in another place the railway makes a complete circle while climbing a spur, as on the Darjeeling Himalayan Railway.

That there is still room for a very great expansion of railways in India will be evident when it is remembered that there are only 1.2 miles of railways for every 10,000 inhabitants in India and Burma, as compared with 5.4 miles in England and 22.8 miles in America, and only 2.1 miles for every 100 sq. miles, as compared with 19.3 miles and 8.4 miles in England and America respectively.

PASSENGER TRAFFIC.

Passenger traffic is increasing yearly, and in 1922-23 about 573,000,000 passengers were carried. About 503,000,000 of these were third-class passengers. The third class in India is the lowest of four classes—first, second, intermediate and third—and the rate charged per mile third class is probably the lowest in the world, and only comes to a little over $\frac{1}{4}$ d. a mile against $1\frac{1}{4}$ d. a mile in England.

Models of the carriages in which third-class passengers are carried will be found in the Railway Court.

GOODS TRAFFIC.

In addition to passengers, about 94,000,000 tons of goods were carried during the year ending 31st March, 1923. The most important commodities carried on Indian railways were:—

| | <i>Earnings.</i> | <i>Tons.</i> |
|-------------------------------|------------------|-----------------|
| Coal | £5.69 millions | 114.97 millions |
| Cotton and yarn | £3.97 " | 1.60 " |
| Oil and oilseeds | £3.54 " | 3.12 " |
| Rice | £2.50 " | 3.95 " |
| Wheat and flour wheat | £1.59 " | 1.63 " |
| Other grains | £2.50 " | 2.82 " |
| Metals | £2.20 " | 2.89 " |
| Sugar | £1.63 " | 1.33 " |

The total earnings of Indian Railways were about £70,500,000, of which about £25,000,000 were earned from passenger traffic and £39,000,000 from goods.

INDIAN TRAINS.

Indian trains on the broad gauge are, as a rule, longer and heavier than trains in England. Although the average gross weight of a passenger train is only 350 tons, and of a goods train only 667 tons, trains of about 2,200 tons gross weight are sometimes run, and trains of 1,400 tons gross weight are quite common.

All the important mail and boat trains consist of up-to-date bogie stock, and comfortable dining cars are attached. Models of such stock will be found in the Railway Court. Experience has shown that corridor carriages are not suitable for Indian conditions, and first-class carriages consist of compartments to seat and sleep either four or two, with its own bath room attached. These compartments can be reserved.

It must be remembered that distances are long in India, and that it takes about 48 hours to go from Bombay to Lahore, a distance of 1,162 miles, and another 12 hours to go on to Peshawur, which is 287 miles further on.

SPECIAL ARRANGEMENTS FOR TOURISTS.

Parties visiting India can also hire tourist cars, a model of which will be found in the Great Indian Peninsula Railway Court. These consist of a saloon, sleeping accommodation, bath room (with a large bath and shower bath), kitchen and servants' accommodation. Various firms are willing to supply cooks and servants, and with a tourist car there is no difficulty in travelling from one place to another, as the car will wait for one while visiting the sights at any town, and act as a travelling home. Comfortable up-to-date hotels will also be found at most of the cities which tourists visit.

INDIA AS A TOURIST CENTRE.

India is the Land of Sunshine and is an ideal country in which to spend the winter months. The best months for a visit are November, December, January and February. March begins to warm up in the South of India although it is still quite cool in the north, but by May the temperature has risen to 110 deg. in the shade, and the wise tourist has left for home or gone to one of the many beautiful hill stations or to Kashmir. If Venice can be imagined in the heart of Switzerland, that is Srinagar in Kashmir in the spring. Lakes covered with lotus, banks of flowers, hills in the foreground, snow-capped mountains in the distances, and bright sunshine, go to make up one of the most beautiful spots in the world. April, May and early June are the best months to visit Kashmir, and a houseboat is the best home. After that it is advisable to go up one of the valleys or to one of the hill stations until September, as the low ground is unhealthy and mosquitoes and flies abound.

The tourist has the choice of many ports to enter India, such as Karachi, Bombay, Madras, *via* Ceylon, and Calcutta. Many visitors select Bombay or Calcutta, and visit first of all the wonderful buildings dating back to the Moghul period, which is generally considered as the finest period from an architectural point of view. Akbar, the greatest of the Moghul Emperors, was a contemporary of Queen Elizabeth, and Agra and Delhi contain the finest examples of his work. Agra also possesses that wonder of the world, the famous Taj Mahal, built by the Emperor Shah Jehan.

Others start their trip at Colombo in Ceylon, and cross to Dhanushkodi in India, *via* Adams Bridge, and visit Southern India first. The sea journey across to India lasts only about two hours, and the passage is generally smooth from October to February. Southern India is *par excellence* the land of temples, and in Madura there are probably some of the finest temples in the world containing the most wonderful carvings.

Very fine examples of a much earlier style of architecture exist in the temples which the Buddhists carved out of rock in the side of a hill, of which the Caves of Ellora and the Karli Caves are some of the best examples.

Visitors also generally visit one or more of the holy cities of India, such as Benares, or cities famous from their connection with the mutiny such as Lucknow and Delhi, or some of the old buried cities of India such as Taxilla, which has only lately been opened up.

The exhibits from Indian Railways will be found in three courts adjacent to each other in the north-east corner of the Indian Pavilion. The relative position of these three courts are shown in the following small plan.

In Court "A," which is the largest court, will be found exhibits from the following railways :—

| | |
|---------------------------------|--|
| Bengal Nagpur. | North Western. |
| Bengal & North Western. | Oudh & Rohilkhand. |
| Bombay, Baroda & Central India. | Darjeeling Himalayan. |
| Great Indian Peninsular. | Howrah Amta. |
| Madras & Southern Mahratta. | Railways under Messrs. McLeod & Co. |

Bridge models of the Adamwahan and Kushalgarh Bridges, over the Sutlej and Indus Rivers respectively, both on the North Western Railway, will also be found here.

Court "B" contains exhibits from the Eastern Bengal, Madras & Southern Mahratta and South Indian Railways, and Court "C" exhibits from the East Indian Railway.

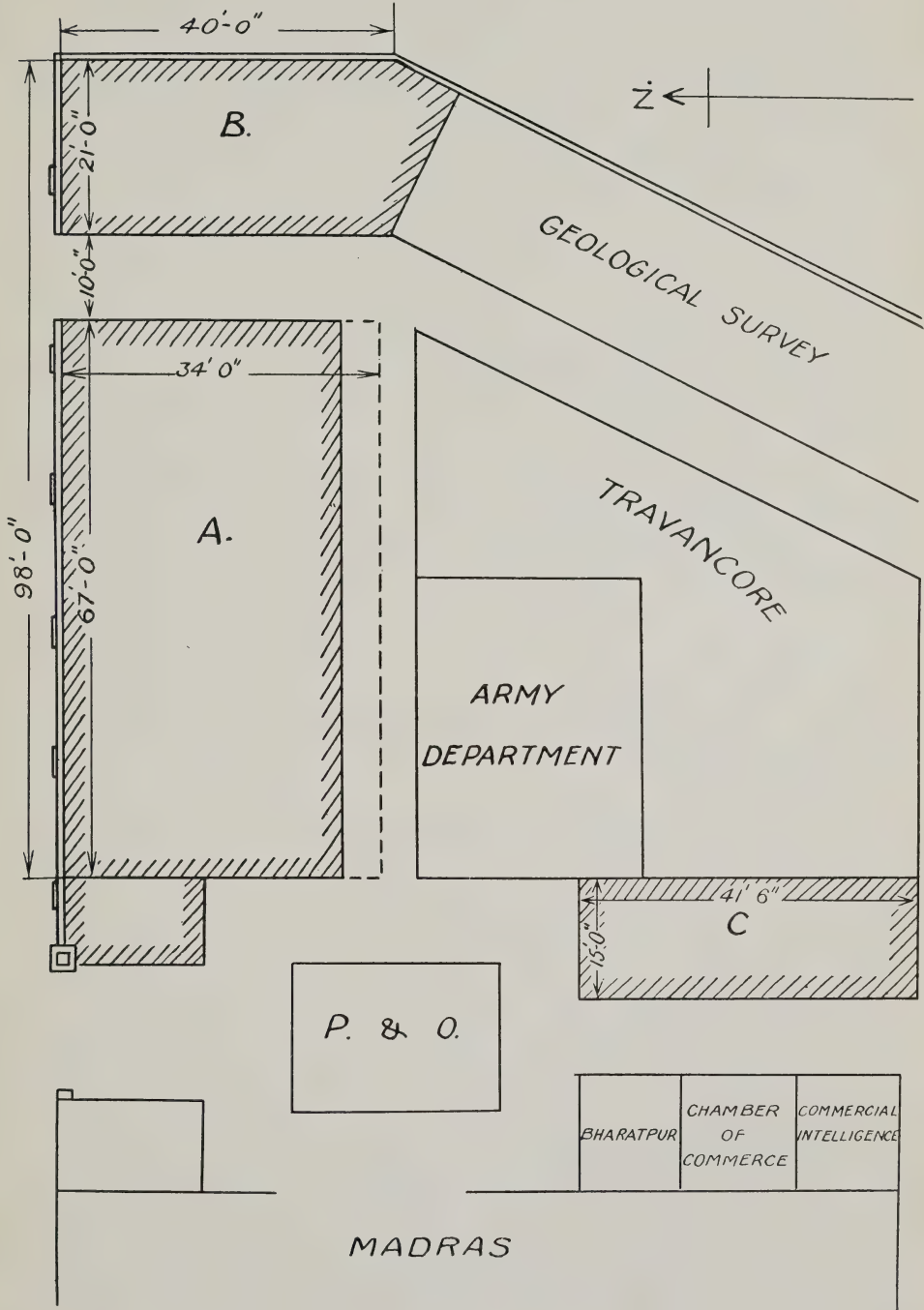
An Enquiry Office will be found adjacent to Court "A."

The outer boundaries of Courts "A" and "C" have been designed in the Moghul style of architecture, while that of Court "B" is in the Dravidian Temple style.

The area occupied by the North Western Railway's exhibits has also been outlined by a boundary of Indian design.

The model of the Hardinge Bridge will be found in the Bengal Court.

PLAN SHOWING POSITION OF RAILWAY COURTS A.B.C.



Railways

LIST OF EXHIBITS

COURT "A"

Bengal Nagpur Railway.

1. Models of a first and second class 68 ft. Bogie Composite Carriage, and of a 68 ft. bogie Restaurant Car. Scale 1 in. = 1 ft.
2. Relief model of the proposed Harbour at Vizagapatam. Scale—4 ins. to the mile.
3. An actual broad gauge (5 ft. 6 ins.) Bogie Coal Hopper wagon to be displayed in Messrs. Cammell, Laird & Co.'s Court.

Note.—Models 1 and 3 are of broad gauge (5 ft. 6 ins.) stock.

COMPOSITE CARRIAGE AND RESTAURANT CAR.

The Restaurant Car model is shown in complete outside elevation. The Composite Carriage is exhibited one-half in outside elevation, and the other in longitudinal section through the vehicle.

The fittings of both vehicles are exact replicas of those in coaches in service, and the models are painted with the Bengal Nagpur Railway standard colours.

Both have been fitted with electric lights and fans.

The Composite Carriage shows three compartments arranged for day travel and two compartments for night travel. The Bengal Nagpur Railway's standard arrangement of lavatories for both European first and second class passengers and Indian second class passengers is shown, and includes pin and shower baths.

The Permanent Way is an exact reproduction of the standard rail, sleeper and ballast.

These models were made by Indian labour under European supervision.

VIZAGAPATAM HARBOUR.

This model shows the site on which it is proposed that the Harbour should be built, the work contemplated in the first instance, and the possibilities for future developments.

Bengal and North Western Railway.

Photographs, etc., of bridges, stations, and of other points of interest on the line.

BENGAL & NORTH WESTERN RAILWAY.

1. Model of upper class Passenger Carriage. Scale $\frac{3}{4}$ in. = 1 ft.
2. Model of four-wheeled covered Goods Wagon. Scale $\frac{3}{4}$ in. = 1 ft.
3. Model of Ferry Steamer.
4. Photographs of bridges, stations, ferry steamers, rolling stock, and of other points of interest on the line.

Note.—Models 1 and 2 are of metre gauge 3 ft. 3 $\frac{3}{8}$ ins. stock.

UPPER CLASS PASSENGER CARRIAGE.

This model shows a present-day type of bogie Composite Carriage, with first and second class compartments and a first class coupé. It is designed to seat 15 in the first class and 18 in the second, or to sleep 8 in the first class and 12 in the second.

The model, built of teak wood on a steel underframe, is complete in every respect, the bogies with rocking cradles and triple springs being exact to scale.

FOUR-WHEELED COVERED GOODS WAGON.

The length on buffers of this type of wagon is 20 ft. 6 ins., and its carrying capacity is 11·3 tons.

Bombay, Baroda and Central India Railway.

1. Model of four-wheeled Third-class Carriage. Scale $1\frac{1}{2}$ ins. = 1 ft.

2. Model of bogie Third-class Carriage. Scale $1\frac{1}{2}$ ins. = 1 ft.

3. Model of Saloon No. 10. Scale $1\frac{1}{2}$ ins. = 1 ft.

4. Model of bogie "F" Class Wagon. Scale $\frac{3}{4}$ in. = 1 ft.

5. Model of four-wheeled Saloon. Scale $\frac{3}{4}$ in. = 1 ft.

6. Model of bogie Saloon. Scale $\frac{3}{4}$ in. = 1 ft.

Note.—Models 1 to 4 are of broad gauge (5 ft. 6 ins.) stock, and models 5 and 6 of metre gauge (3 ft. $3\frac{3}{8}$ ins.) stock.

FOUR-WHEELED THIRD-CLASS CARRIAGE.

This model represents the type of four-wheeled lower-class Carriages in use on this railway 60 years ago. It will be noticed that they were double deckers, *i.e.*, there was one floor at the floor level for passengers, and another floor above, which comprised the top deck. Passengers used to climb up inside by means of steps at the ends. Both the bodies and the underframes of these carriages were constructed entirely of wood, principally teak.

BOGIE THIRD-CLASS CARRIAGE.

This model shows the present-day type of a third-class Carriage. They are 64 ft. in length and 10 ft. wide, and carry 122 passengers. These carriages are divided into 12 compartments with doors for each compartment. The whole of the construction of the body of these carriages is in teak, while the underframe is of steel. The insides of third-class Carriages are made as plain as possible so that they can be easily cleaned.

SALOON NO. 10.

This is the model of one of the Officers' Saloons on the above railway, and is divided up into compartments as follows:—

The main saloon compartment with fixed couch and one folding bed, writing desk, arm chairs, etc.

Bath room, which has a marble bath floor and a marble dado.

Kitchen with the usual arrangements.

Servants' compartment.

Secretary's compartment.

The inside finishing of the main saloon compartment is done out in silk, oak and silver beech. The other compartments are finished out in teak.

BOGIE "F" CLASS WAGON.

These wagons have a carrying capacity of $38\frac{1}{2}$ tons, with a gross load of 59 tons. They are 45 ft. long and 10 ft. wide, and are designed for carrying special long loads.

FOUR-WHEELED SALOON.

This Saloon was used by the late King Edward VII during his tour in India as Prince of Wales in 1876. The Saloon is 22 ft. 9 ins. over buffers, and 6 ft. 9 ins. wide.

BOGIE SALOON.

This Saloon was used by King George V on the occasion of his visit to India as Prince of Wales in 1905, and was also used by His Majesty during his tour in India as King Emperor in 1911, and by H.R.H. The Prince of

Wales on the occasion of his visit to India in 1921. This Saloon is 57 ft. 8 ins. over buffers, and 12 ft. wide, and was built in the carriage and wagon shops at Ajmer.

Great Indian Peninsular Railway.

1. Model of a Tourist Car. Scale $\frac{3}{4}$ in. = 1 ft.
2. Paintings and photographs of the Great Indian Peninsular Railway, and of places of interest in India.

Note.—Model 1 is of broad gauge (5 ft. 6 ins.) stock.

Arrangements have been made in the Great Indian Peninsular Railway Court to display coloured pictures and places of interest in India.

This Court contains chairs and writing tables, with a supply of writing paper and envelopes for the use of visitors.

Pamphlets, entitled "The Road to India's Past," written by Mr. St. Nihal Singh, will be distributed in this Court.

Madras and Southern Mahratta Railway.

1. Model of the General Offices at Madras.
2. Model of a 4-6-0 Passenger Locomotive. Scale $1\frac{1}{2}$ ins. = 1 ft.

Note.—Model 2 is of broad gauge (5 ft. 6 ins.) stock.

Model 1 will be found in the adjacent Court "B."

PASSENGER LOCOMOTIVE.

This model represents a present-day locomotive used on passenger service, and was built entirely by Indian labour in the railway workshops.

North Western Railway.

1. Model of Saloon specially built for the use of H.R.H. The Prince of Wales during his tour in India in 1921-22. Scale $\frac{3}{4}$ in. = 1 ft.
2. Model of a first and second-class Composite Carriage on the Kalka Simla Railway. Scale $1\frac{1}{2}$ ins. = 1 ft.
3. Model of Standard Type of Covered Goods Wagon. Scale $1\frac{1}{2}$ ins. = 1 ft.
4. Model of typical Single Line Interlocked Crossing Station. Scale 1 in. = 20 ft. longitudinal. 1 in. = 5 ft. transverse.
5. Photographs of views and works of interest on the railway.

Note.—Models 1 to 3 are of broad gauge (5 ft. 6 ins.) stock.

Model 2 is of narrow gauge (2 ft. 6 ins.) stock.

SALOON USED BY H.R.H. THE PRINCE OF WALES.

The Saloon consisted of a day compartment, large bedroom, tiled lavatory, valet's compartment and box-room. The interior of the saloon was furnished entirely in selected teak. The general scheme was plain cappings and fielded panels both above and below the waist. The internal fittings were of "Adams" design, silver oxidised. The ceiling, which was of the semi-clerestory type, was panelled with salamander asbestos millboard panels painted white, and relieved with polished teak mouldings. Frameless glass windows were fitted in each compartment, also venetian and gauze wire drop lights, over which silk tapestry curtains were hung.

The day compartment was furnished with easy and occasional chairs, a chesterfield couch, a roll-top desk and a card table.

The bedroom was furnished with an oxidised silver metal bedstead, a dressing table, a wardrobe, a bedside table, a chest of drawers and a chair.

Roof fans were fitted for use while the train was travelling over those provinces of India where the heat necessitates the use of this convenience, and electric radiators were provided to heat the coach in other provinces where the cold during the winter months is at times intense.

The lavatory was furnished with a large porcelain bath, ash basin mounted on a nickel-plated stand, a towel rail, and oval mirror, etc.

A flat table was fitted in the box-room for ironing linen, the current for the laundry irons being obtained from the electric equipment.

This Saloon was one of the 11 bogie carriages which formed the special train for H.R.H. the Prince of Wales.

The model was made entirely by Indian workmen in the carriage and wagon shops of the North Western Railway, and was presented to His Royal Highness on the occasion of his visit to these workshops in February, 1922. The model has been graciously lent by His Royal Highness for exhibit at this Exhibition.

COMPOSITE FIRST AND SECOND-CLASS CARRIAGES.

The model exhibited represents the latest type of a bogie composite carriage, providing seating accommodation for 9 first and 13 second-class passengers.

The carriage has a width of 6 ft. 7 $\frac{7}{8}$ ins. inside, and 30 ft. $\frac{3}{8}$ in. in length over headstocks.

It is used on the Kalka Simla Railway, a 2 ft. 6 ins. gauge line which connects Kalka, the terminus of the broad gauge system at the foot of the hills, with Simla, which is the summer headquarters of the Government of India.

STANDARD COVERED GOODS WAGON.

This wagon is intended for general traffic and has a capacity of 22 tons, with a tare of 9 tons 16 cwt. The cubic capacity is 1526.69 cubic feet, and the length over buffers is 23 ft. 8 ins.

SINGLE LINE INTERLOCKED CROSSING STATION.

This is a typical example of a two line interlocked Crossing Station on the single line 5 ft. 6 ins. gauge. It is designed to hold a goods train of 72 vehicles, which, with engine and brake-van, has a total length of 1,870 ft. It has a main line and one loop line with a short goods siding. The loop line is isolated from the main line by a short sanded dead-end at each end of the loop line. A passenger platform is shown with station buildings, a goods platform with small goods shed, and also a level crossing with a road leading up to the station. Owing to the want of space on the model the outer signals are shown close to the home signals, but in actual practice they are placed 1,920 ft. away from the facing points. All signals are operated from a lever frame on the platform near the station-master's office. The points are key-locked and worked by ground frames. Once the control key has been turned in the lock at the facing points it becomes automatically locked until the station-master has restored his key in its lock in his office. The signal levers on the platform are interlocked with each other, so that signals cannot be lowered for conflicting movements. With this system the station-master on duty is responsible for the working of the signals.

With stations having more than three reception lines it is not found practicable to have key interlocking, and it then becomes necessary to provide signal cabins at each end of the yard.

Oudh and Robilkhand Railway.

Model of Hardwar Station. Scale 1 in. = 5 ft.

Hardwar, which is about 100 miles north-east of Delhi, is a town of great antiquity, situated on the banks of the Ganges, and held in great veneration by Hindus, who make pilgrimages from all parts of India to worship at its shrines, and to bathe in the sacred Har-ki-pairi pool. " Melas " occur several times during a year, and of the numerous melas held at Hardwar, the principal

one is that which occurs in April, when the sun enters "Aries," on the first day of the solar year, the traditional birthday of the Ganges. Every twelfth year this particular mela receives additional sanctity by reason of the planet Jupiter being in Aquarius, and is then known as the "Kumbh" mela, which is by far the most important of all the melas.

On such an occasion the traffic handled at a small station like Hardwar, which is on a single line branch of the Oudh & Rohilkhand Railway, is very heavy, and the model shows the special arrangements made for dealing with this traffic. Special booking offices marked by coloured flags for various routes are opened temporarily, and those passengers who have taken tickets are shepherded into enclosures also marked by coloured flags for the various routes. Large numbers of railway officials are drafted to Hardwar to assist in directing the several hundred thousands of pilgrims, most of whom are illiterate, and to ensure that they proceed by the right train after obtaining their tickets. When a special train is ready on the platform the people from one enclosure, which holds only sufficient passengers to fill one train, are allowed to the platform, and this avoids overcrowding and confusion at the train.

Special police, sanitary and medical arrangements are also made, and the danger of an outbreak of cholera has always to be guarded against.

In order to provide pilgrims with food while on railway premises shopkeepers are brought in, and the food sold is inspected by a special staff, who see that nothing of a doubtful nature is sold to the public, and also that prices charged are according to the local rates.

A model of the medical arrangements made at such melas will be found among the East Indian Railway exhibits.

Darjeeling Himalayan Railway Company.

1. Model of a Bogie covered Goods Wagon. Scale $1\frac{1}{2}$ ins.=1 ft.
 2. Photos of the main line and Teesta Valley Extension.
- Note.*—Model 1 is of narrow gauge (2 ft. 6 ins.) stock.

Howrah Amta Light Railway Company.

1. Model of a covered Goods Wagon. Scale $1\frac{1}{2}$ ins.=1 ft.
 2. Photos illustrating the working of the line.
- Note.*—Model 1 is of narrow gauge (2 ft.) stock.

Railways under Messrs. McLeod & Co.

1. Model of a low-sided Wagon, four-wheeler. Scale $\frac{3}{4}$ in.=1 ft.)
- Note.*—This model is of narrow gauge (2 ft. 6 ins.) stock.

Models of Railway Bridges.

1. Model of Kushalgarh Bridge.
2. Model of Hardinge Bridge.
3. Model of Adamwahan Bridge.

KUSHALGARH BRIDGE.

This Bridge is found on the North Western Railway and crosses the river Indus. It is 766 ft. long, and consists of two spans, one of which is 459 ft. It has been designed to carry a double track of railway on the top boom and a 16 ft. roadway on the bottom boom.

The model has been prepared by the Tees Side Bridge and Engineering Works.

HARDINGE BRIDGE.

This Bridge is found on the Eastern Bengal Railway and crosses the river Ganges at Sara Ghat. The model shows one span together with the service girder on which it was erected. The table on which it stands represents the river bed. Beneath this there are models of two wells so as to enable visitors to realise the amount of hidden work.

The Bridge is 5,894 ft., or over a mile in length. It consists of 15 main spans, 6 land spans, and two short spans. The span in the clear of the main spans is 345 ft. $1\frac{1}{2}$ ins. The total weight of girders comes to 19,546 tons, and the Bridge is designed to carry a double track of railway with footways on brackets outside the down stream girder. The Bridge cost over £1,600,000 to build.

ADAMWAHAN BRIDGE.

This Bridge is found on the North Western Railway, and crosses the river Sutlej. It is 4,210 ft. long, and consists of 16 spans each of 250 ft. in the clear. It is built to carry a single track of railway, and has a combined road and railway on the same level.

COURT "B"

Eastern Bengal Railway.

1. Model of a metre gauge (3 ft. $3\frac{3}{8}$ ins.) Wagon Ferry in use on the Brahmaputra river. Scale $\frac{1}{2}$ in.=1 ft.
2. Maps, Diagrams and Photographs of the Eastern Bengal Railway.

WAGON FERRY.

This model consists of a Tug, Flat, Pontoons, Shore Connections and Rolling Stock accurately modelled on that in use at Pandu Ghat on the Brahmaputra River, which forms a connecting link with the Assam Bengal Railway and the hill station of Shillong. The Tug crosses the river with a Flat on either side, each with a carrying capacity of 24 metre gauge four-wheeled Wagons.

This model was made in the Loco and Carriage Shops by Indian artisans under European supervision.

Madras and Southern Mahratta Railway.

1. Model of the General Offices at Madras.
 2. Model of a 4-6-0 Passenger Locomotive. Scale $1\frac{1}{2}$ ins.=1 ft.
- Note.*—Model 2 is of broad gauge (5 ft. 6 ins.) stock, and will be found in adjacent Court A.

GENERAL OFFICES.

The building has a plinth area, including quadrangles, of 82,155 square ft. The superstructure is built of brick faced on three walls with Porebunder stone from Bombay. The design of the facade is based on the Dravidian work of Southern India adapted to conform to the requirements of an office building. A feature of the edifice is the main staircase hall and dome, the latter being octagonal in plan and 40 ft. in span with a height of 77 ft. above pavement. The central towers rise to a height of 125 ft. 6 ins. above the roadway, and with the corner towers contain the tanks for the water supply for the fire hydrant and sanitary systems.

The building is fitted throughout with electric lights and fans, and an electric lift is provided near the main entrance.

The building was completed in December, 1922.

South Indian Railway.

THE DEVELOPMENT OF TRANSPORTATION IN SOUTH INDIA.

The idea of this exhibit is to illustrate the development of Transport in that part of Southern India served by the South Indian Railway Company, whose headquarters are at Trichinopoly, about 250 miles south of the presidency town of Madras. In order to follow the course of this development it is necessary to commence on the left where are shown models of men and animals illustrating how transport was carried out in the early days, viz., by means of palanquins, pack animals and coolies carrying loads on their heads.

In this section of the exhibit is presented a rock with a Hindu temple on top, a position, which, being considered sacred, is a favourite one for temples throughout Southern India. The road in the foreground leads past a toddy or liquor shop and continues through a village seen in the distance. A little further along is more modern transport in the shape of bullock carts. At this point can be noticed men climbing palmyrah and cocoanut trees to collect the sap, which, when fermented, becomes the local intoxicating beverage known as "Toddy." Close by lies a broken-down bullock cart—a not unusual scene. Further along can be seen loads of paddy (rice) and bananas passing along the road on either side of which are large stretches of paddy ground under cultivation.

Cattle are grazing in the distance and Pariah dogs, monkeys, crows, etc., can be seen at various places.

Double bullock carts and pony jutkas are developments which are shown in the next stage. Attention is drawn to water buffaloes which are used very largely for ploughing, and also as beasts of burden.

The commencement of early Railway Transport is now reached, and is illustrated by means of models of old-fashioned passenger coaches and goods wagons and an old type of engine which it will be noticed is fitted with the old spark arrestor required in days when only wood was burnt.

A train is seen standing at the station of the type in use about 40 or 50 years ago, and as was usually the case in those days, is a mixed train consisting of both passenger and goods vehicles. The method of watering engines was by coolies carrying chatties of water as shown in the model.

In the distance can be seen another village, and in the vicinity of the station-master's quarters a small grove of plantain or banana trees. Painted on the station board both in English and Tamil characters is the name "Saliamangalam," meaning "Paddy Village."

From this point the railway curves away behind the hills, reappearing at the mouth of a tunnel from which is emerging a modern train, the Down Boat Mail, which is about to enter the station at the extreme right of the model.

This station represents a modern crossing station and locomotive depot fitted with up-to-date appliances. Only part of the station is shown, and this includes a covered waiting shed for the accommodation of third-class passengers, a very necessary provision, as, even in these days, passengers arrive at the station many hours before the scheduled time of the train. The signal box shown controls the whole of one end of the yard, and is itself electrically controlled from the station-master's office. The signalling, which is of the standard laid down by the Railway Board, consists of home and outer signals, starters and advanced starters, the latter being interlocked with single line token instruments.

The signals, it will be seen, are lowered for the reception on the platform line of the approaching mail, and on the loop line is a model of a 4-6-0 "M" class Superheated Express Passenger Engine, the type used for hauling the boat train between Madras and Dhanushkodi and other mail and passenger

trains. This engine is about to back on to the two passenger coaches and draw them ahead to clear the line for an incoming up train which is expected.

Near the engine shed will be seen a 4-6-0 "MT" class Tank Engine, which is the latest type used for the Madras Suburban Service; also an up-to-date Goods Wagon loaded with coal. Standing at the goods shed platform is a timber truck loaded with logs and a bogie covered goods being loaded with bags of paddy.

On the platform will be seen figures of passengers with their baggage, some squatting (their favourite position) waiting for the train, and also some of the station staff. The figure in white with the initials "P.G.," is the passenger guide, and inside the waiting shed can be seen passengers obtaining tickets at the booking window. Within the station premises can be seen three models of quarters provided by the Railway Company for the staff, and at the back of the station are a number of bullock carts and pony jutkas waiting for fares.

COURT "C"

East Indian Railway.

1. Model of "Express" 2-2-2 Saturated Passenger Tank Engine. Scale 1 in. = 1 ft.
 2. Model of "P" class 4-6-0 Saturated Passenger Engine and Tender. Scale 1 in. = 1 ft.
 3. Model of "GS" class 2-8-0 Superheated Goods Engine and Tender. Scale 1 in. = 1 ft.
 4. Model of a Double Decker Third-class Carriage. Scale 1 in. = 1 ft.
 5. Model of a Bogie Third-class Carriage. Scale 1 in. = 1 ft.
 6. Model of an Iron Open Coal Wagon. Scale 1 in. = 1 ft.
 7. Model of I.R.C.A. Standard Coal Wagon. Scale 1 in. = 1 ft.
 8. Photographs, etc., of places of interest on the East Indian Railway.
- Note.*—Models 1 to 7 are of broad gauge (5 ft. 6 ins.) stock.

MODEL OF "EXPRESS" 2-2-2 SATURATED PASSENGER TANK ENGINE.

This model is one of the first engines to work passenger trains over the East Indian Railway from Howrah to Raneeunge in the year 1857. The original engine is still preserved mounted on a pedestal at the main entrance of the locomotive workshops at Jamalpur, Bihar.

MODEL OF "P" CLASS 4-6-0 SATURATED PASSENGER ENGINE AND TENDER.

This model of a Passenger Engine shows the great difference between a present-day engine and the engines that were used at first. Not only has the weight increased from 26 tons to 101 tons, but its tractive effort at 75 per cent. boiler pressure has increased from 3,960 lbs. to 16,700 lbs.

MODEL OF "G.S." CLASS 2-8-0 SUPERHEATED GOODS ENGINE AND TENDER.

This model shows a type of Goods Engine in common use for hauling heavy freight trains, and was introduced in the year 1906. Its tractive effort at 75 per cent. boiler pressure is 26,730 lbs., and the total weight of engine and tender in working order is about 138 tons.

MODEL OF BOGIE THIRD-CLASS CARRIAGE.

These two models show the improvements introduced in carriages used for third-class passengers since railways first started in India.

The present-day carriage is in every way more comfortable, and has increased in length from 26 ft. 2 ins. to 71 ft. 6 ins., and in weight from 9 tons to 35 tons.

MODEL OF IRON OPEN COAL WAGON.

MODEL OF I.R.C.A. STANDARD COAL WAGON.

The Iron Open Coal Wagon is used only for coal traffic, and can carry a load of 19 tons. The Standard Coal Wagon is also used for general traffic, and can carry a load of 22 tons.

GEOLOGICAL SURVEY OF INDIA

(Arranged by J. Coggin Brown, O.B.E., D.Sc., Superintendent, under the orders of E. H. Pascoe, M.A., Sc.D., D.Sc., Director.)

THE collection of Indian rocks, minerals, geological maps and photographs, displayed in the Indian Imperial Court, have been obtained either by the officers of the Geological Survey of India or as donations from mining firms at the request of this Department. On account of the limited space reserved for the purpose of the all-India mineral exhibit, only small selections have been made from the extensive collections of the Survey. These have been grouped as follows :—

| | | |
|-----------|----------|---|
| Class I | Rocks | |
| Class II | Minerals | { Ores. { Other minerals of economic importance. { Minerals of scientific interest. { Geological maps and sections. { Photographs. { Publications. |
| Class III | | |
| | | |
| | | |

The collection of rock specimens is divided into the following sections :—

- A. Archæan rocks of the Peninsula.
- B. Himalayan granites.
- C. Igneous rocks associated with the Peninsular Gneisses.
 1. The Charnockite Series.
 2. Elæolite-Syenites and Augite Syenites.
 3. Pegmatites and associated minerals.
 4. Peridotites and associated rocks.
- D. The Deccan Trap.
- E. Recent volcanic rocks from regions adjoining India.
- F. Rocks from a typical Indian coalfield (Giridih).
- G. Striated and facettèd boulders.

The collection of ores includes the ores of aluminium, antimony, arsenic, chromium, copper, gold, iron, lead, silver, zinc, manganese, molybdenum, tin, titanium, tungsten and zirconium.

The collection of minerals of economic importance includes abrasive minerals, asbestos, barytes, borax, calcium salts, coal, graphite, magnesium compounds, mica, monazite, ochres, oil shale, ornamental stones, petroleum and its products, phosphates, potassium salts, rare earth minerals, refractories, salt, slate, steatite, strontium salts and sulphur.

The detailed descriptions of each set of specimens are prefaced by a brief account of the occurrence of the particular species in India, and the position it occupies in the mineral industry of the country.

The collection of minerals of scientific interest, contains examples of the magnificent zeolites from the Deccan Trap ; the agates, jaspers, and associated forms of silica from the same formation, bi-pyramidal quartz crystals from the gypsum of the Salt Range, tourmaline from Kashmir and Rajputana, and many other minerals found in India.

The collection of maps and sections is designed to illustrate the detailed work of the Geological Survey of India, both in the Peninsula, the adjoining regions on the east and west, and the Himalaya.

Unless otherwise stated the specimens referred to in this catalogue have been collected by officers of the Geological Survey of India. For the sake of brevity village names have been omitted from the descriptions, but each specimen bears a registered number, and fuller details regarding any of them may be obtained on application to the Director, Geological Survey of India, 27, Chowringhee Road, Calcutta.

J. COGGIN BROWN,

Superintendent, Geological Survey of India.

Calcutta,

December 14th, 1923.

CLASS I.—ROCKS.

- A. Archæan rocks of the Peninsula.
- B. Himalayan granites.
- C. Igneous rocks associated with the Peninsular Gneisses.
 - 1. The Charnockite Series.
 - 2. Elæolite-Syenites and Augite-Syenites.
 - 3. Pegmatites and associated minerals.
 - 4. Peridotites and associated rocks.
- D. The Deccan Trap.
- E. Recent volcanic rocks from regions adjoining India.
- F. Rocks from the Giridih Coalfield.
- G. Striated and facettèd boulders.

ARCHÆAN ROCKS OF THE PENINSULA.

BY far the larger portion of Peninsular India is covered by the Archæan crystalline schists and gneisses. They are the foundations upon which the later geological formations were built up. The rocks do not belong to a single system, but are a fundamental crystalline complex, not unlike those occurring in other very ancient parts of the earth's crust. Various classifications have been proposed for them from time to time, but the most recent investigations suggest that they should be divided in ascending order as follows:—(a) the oldest gneisses; (b) The Dharwars—a series of greatly altered sedimentary rocks—sub-divided themselves again into two groups; (c) the older gneisses, such as the Bengal and the Peninsular schistose and garnetiferous gneisses; and, finally, (d) the newer gneisses, like the granitoid Bundelkhand gneisses and the charnockites. In the older group (c), para-gneisses, formed by the metamorphism of sedimentary rocks are frequent, and they are characterised further by a greater abundance of thinly foliated schists. They are well developed south of the Vindhyan basin, in Rewah, Mirzapur and Bihar and Orissa, in the Nellore portion of the Carnatic, and the coastal regions of the Kistna and Godaveri valleys. The newer gneisses (d), on the other hand, are generally more massive and granitoid in texture. The typical rock is a gneiss with orthoclase, oligoclase, hornblende, chlorite and mica. These gneisses are very frequently traversed by veins of pegmatite and by quartz reefs. They are exposed in Lower Bundelkhand, in the Southern Mahratta country, on the highlands of North Salem, the Mysore plateau, and elsewhere. The specimens are arranged to illustrate the various varieties of rocks from the Archæan complex rather than the geological groups in it.

| Serial No. | Reg. No. | Description. |
|---------------|-------------|--|
| 1 | 13,631 | Biotite-gneiss, coarse-grained, Monghyr District, Bihar and Orissa. |
| 2 | 13,581 | Biotite-gneiss, Mohngyr District, Bihar and Orissa. |
| 3 | 13,630 | Biotite-gneiss, fine-grained, with much plagioclase, Monghyr District, Bihar and Orissa. |
| 4 | 3,514 | Gneiss, Chhindwara District, Central Provinces. |
| 5 | 25,684 | Biotite-gneiss, porphyritic, Deogarh, Central Provinces. |
| 6 | 1,250 | Hornblende - biotite - microcline gneiss, Chhindwara District, Central Provinces. |
| 7 | 3,512 | Biotite-gneiss, Chhindwara District, Central Provinces. |
| 8 | 3,510 | Granulite-gneiss, Chhindwara District, Central Provinces. |
| 9 | 30,704 | Hornblende-granite-gneiss, Ramtek, Central Provinces. |
| 10 | 11,954 | Grey granite-gneiss, Salem District, Madras. |
| 11 | 12,321 | Biotite-gneiss, near Hatur, Coorg. |
| 12 | 13,429 | Biotite-gneiss, Coimbatore District, Madras. |
| 13 | 11,444 | Granite-gneiss (" Hosur gneiss "), Salem District, Madras. |
| 14 | 13,455 | Garnetiferous biotite-gneiss, Nellore District, Madras. |
| 15 | 3,759 | Garnetiferous gneiss, Tinnevely District, Madras. |
| 16 | 12,349 | Garnetiferous biotite gneiss, near Merkara, Coorg. |
| 17 | 14,553 | Biotite-gneiss, Wynaad, Madras. |
| 18 | 12,319 | Biotite-granite-gneiss, Kodlipet, North Coorg. |
| 19 | 1,789 | Biotite gneissose granite, porphyritic, Vizagapatam. District, Madras. |
| 20 | 1,566 | Biotite-gneiss, with chlorite and calcite, Wynaad, Madras. |
| 21 | 3,504 | Granite, medium-grained, Chhindwara District, Central Provinces. |
| 22 | 3,507 | Granite, fine-grained, Chhindwara District, Central Provinces. |
| 23 | 30,374 | Granite, coarse-grained, Chhindwara District, Central Provinces. |
| 24 | 28,797 | Coarse, red, biotite granite, Balaghat District, Central Provinces. |
| 25 | 25,830 | Biotite-granite, porphyritic, Chhindwara District, Central Provinces. |
| 26 | 3,504 | Granite, medium grained, Chhindwara District, Central Provinces. |
| 27 | 1,248 | Pink graphic granite, Chhindwara District, Central Provinces. |
| 28 | 13,719 | Hornblende-granite, Raipur District, Central Provinces. |
| 29 | 13,720 | Hornblende-granite, porphyritic, Raipur District, Central Provinces. |
| 30 | 13,753 | Granite, Raipur District, Central Provinces. |
| 31 | 3,011 | Granite, Giridih, Bihar and Orissa. |
| 32 | 3,509 | Granulite, near Chhindwara, Central Provinces. |
| 33 | 11,412 | Hornblende-granite, Salem District, Madras. |
| 34 | 13,628 | Quartz-biotite schist, Hazaribagh District, Bihar and Orissa. |
| 35 | 31,317 | Mica-schist, Singhbhum District, Bihar and Orissa. |
| 36 | 13,774 | Quartz-mica schist, Hazaribagh District, Bihar and Orissa. |
| 37 | 31,604 | Schist, Singhbhum District, Bihar and Orissa. |
| 38 | 11,961 | Magnetite-quartz-schist, Salem District, Madras. |
| 39 | 20,830 | Chlorite-quartz-schist, Nellore District, Madras. |
| 40 | 13,454 | Garnetiferous mica-schist, Nellore District, Madras. |

| Serial No | Reg. No. | Description. |
|--------------|-------------|---|
| 41 | 20,837 | Chlorite-schist, Nellore District, Madras. |
| 42 | 13,463 | Biotite-schist, rich in rutile crystals, Nellore District, Madras. |
| 43 | 14,924 | Mica-schist, Panchmahals, Bombay. |
| 44 | 20,538 | Phyllite, containing pyrite cubes, Singhbhum District, Bihar and Orissa. |
| 45 | 3,439 | Sericite-quartzite, Singhbhum District, Bihar and Orissa. |
| 46 | 13,596 | Chiaistolite-schist, Hazaribagh District, Bihar and Orissa. |
| 47 | 28,820 | Biotite-sericite-quartz schist, Balaghat District, Central Provinces. |
| 48 | 17,905 | Schistose argillite, Raipur District, Central Provinces. |
| 49 | 3,515 | Muscovite-schist, Chhindwara District, Central Provinces. |
| 50 | 30,384 | Biotite-schist, Chhindwara District, Central Provinces. |
| 51 | 1,252 | Biotite-schist, Chhindwara District, Central Provinces. |
| 52 | 29,790 | Biotite-schist, Balaghat District, Central Provinces. |
| 53 | 13,465 | Micaceous chloritic schist, Nellore District, Madras. |
| 54 | 25,749 | Garnet-schist, Jaipur, Rajputana. |
| 55 | 28,585 | Crushed breccia and sillimanite pebbles, Balaghat District, Central Provinces. |
| 56 | 1,837 | Schistose conglomerate, near Jamhora, Central Provinces. |
| 57 | 2,588 | Green quartz-schist, Amjhora District, Central Provinces. |
| 58 | 1,581 | Green quartzite with kyanite and fuchsite, Coimbatore District, Madras. |
| 59 | G.308 | Green avanturine, near Bellary, Madras. |
| 60 | 13,480 | Quartzite, Nellore District, Madras. |
| 61 | 28,523 | Talc, Jabalpur District, Central Provinces. |
| 62 | 23,641 | Pale greenish steatite, Jabalpur District, Central Provinces. |
| 63 | 1,170 | Steatite, Jaipur, Rajputana. |
| 64 | 13,461 | Potstone, Nellore District, Madras. |
| 65 | 12,335 | Quartz-kyanite-schist with rutile, Yedinalkuad, Coorg. |
| 66 | 1,233 | Serpentinous, crystalline limestone, with chondrodite and spinel, Chhindwara District, Central Provinces. |
| 67 | 3,501 | Crystalline limestone, Chhindwara District, Central Provinces. |
| 68 | 1,238 | White crystalline limestone, Chhindwara District, Central Provinces. |
| 69 | 1,232 | Garnet-gneiss altering to calciphyre, Chhindwara District, Central Provinces. |
| 70 | 13,586 | Crystalline limestone with chondrodite, tourmaline and wollastonite, Hazaribagh District, Bihar and Orissa. |
| 71 | 13,591 | Crystalline limestone, Hazaribagh District, Bihar and Orissa. |
| 72 | 1,237 | Crystalline limestone with essonite, Chhindwara District, Central Provinces. |
| 73 | 1,234 | Crystalline limestone (calciphyre), Chhindwara District, Central Provinces. |
| 74 | 12,154 | Crystalline limestone, near Coimbatore, Madras. |
| 75 | 18,293 | Pink, siliceous manganiferous, crystalline limestone, Jabua State, Central India. |
| 76 | 27,111 | Grey marble with tremolite, Narnaul District, Patiala State, Punjab. |
| 77 | 12,155 | Crystalline limestone Coimbatore District, Madras. |
| 78 | 2,363 | Marble, Jaipur, Rajputana. |

| Serial No. | Reg. No. | Description. |
|---------------|-------------|---|
| 79 | 14,396 | Diopside-garnet-marble, Ganjam District, Madras. |
| 80 | 759 | Spessartite-limestone, near Par Seoni, Central Provinces. |
| 81 | 11,167 | White crystalline limestone with spinel and chondrodite, Mandalay District, Burma. |
| 82 | 11,132 | Crystalline limestone with chondrodite and spinel, Mandalay District, Burma. |
| 83 | 2,796 | Crystalline limestone with spinel and pyrrholite, Mandalay District, Burma. |
| 84 | 11,146 | Crystalline limestone with graphite, Mandalay District, Burma. |
| 85 | 18,419 | Khondalite, Vizagapatam District, Madras. |
| 86 | 15,960 | Khondalite, Vizagapatam District, Madras. |
| 87 | 15,180 | Khondalite, Kalahandi State, Orissa. |
| 88 | 12,341 | Biotite-sillimanite-gneiss, Yedinalkuad, Coorg. |
| 89 | 13,161 | Pyroxene-scapolite granulite with garnet, Coimbatore District, Madras. |
| 90 | 11,212 | Pyroxene-scapolite-granulite, Mandalay District, Burma. |
| 91 | 13,160 | Pyroxene-scapolite granulite, Coimbatore District, Madras. |
| 92 | 21,954 | Altered spessartite-rhodonite rock, Nagpur District, Central Provinces. |
| 93 | 787 | Amphibole-gondite, Nagpur District, Central Provinces. |
| 94 | 708 | Biotite-kodurite, Vizagapatam District, Madras. |
| 95 | 706 | Opalised kodurite, Vizagapatam District, Madras. |
| 96 | 15,679 | Khondalite, Vizagapatam District, Madras. |
| 97 | 15,186 | Graphite-khondalite, Kalahandi State, Orissa. |
| 98 | 1,230 | Gritty limestone, Chhindwara District, Central Provinces |
| 99 | 15,156 | Diopside-quartz-garnet rock, Kalahandi State, Orissa. |
| 100 | 703 | Quartz-apatite-orthoclase rock, Vizagapatam District, Madras. |
| 101 | 3,036 | Calcareous quartzite with scapolite, Gangpur State, Bihar and Orissa. |
| 102 | 1,253 | Amphibolite, Chhindwara District, Central Provinces. |
| 103 | 3,090 | Feather amphibolite, Chhindwara District, Central Provinces. |
| 104 | 27,173 | Feather amphibolite, Chhindwara District, Central Provinces. |
| 105 | 10,709 | Epidiorite with scapolite and sphene, Giridih, Bihar and Orissa. |
| 106 | 27,160 | Epidiorite, Chhindwara District, Central Provinces. |
| 107 | 3,502 | Epidiorite, Chhindwara District, Central Provinces. |
| 108 | 1,253 | Amphibolite, Chhindwara District, Central Provinces. |
| 109 | 15,145 | Amphibolite, Kalahandi State, Orissa. |

HIMALAYAN GRANITES.

THE axis of the great Himalayan range lies, according to the late Sir Henry Hayden, on a continuous zone of granite and associated crystalline rocks. This belt extends for some distance on either side of the axis, and separates the old Himalayan sedimentary systems from the Tibetan zone to the north, sending out, at the same time, ramifications in all directions. Of the granite there are at least two varieties, (1), a foliated rock composed essentially of quartz, felspar and biotite, and (2), a younger, non-foliated form containing, in addition to quartz and felspar, muscovite, tourmaline, beryl and various accessory minerals. The former variety was for long regarded as a sedimentary rock which had been converted by heat and pressure into gneiss, but its intrusive character is now recognised, for it has been proved conclusively that the central gneissose rock of the Himalaya is in reality a granite crushed and foliated by pressure. Instead of being the oldest of all the Himalayan rocks it is one of the youngest members, probably coincident in age with the disturbances to which the origin of the Himalayas is ascribed. These occurred towards the end of the Eocene division of the Tertiary period. The gneiss is frequently pierced by veins of non-foliated granite.

The crystalline belt is thus composed of three elements, *viz.*, intrusive granite, metamorphic schists (due probably to the action of the granite on the rocks into which it has been intruded), and lastly, a series of old gneisses, schists, granulites and crystalline limestones of Archæan age—the northerly extension of the similar rocks of the Indian Peninsula.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| II0 | 6/855 | Gneissose granite. |
| III | 29/329 | Granite, near Golen, Chitral. |
| II2 | 15/637 | Granite, near Korzok, Rupshu. |
| II3 | 15/639 | Foliated granite, Tso Moriri, Rupshu. |
| II4 | 29/332 | Granite, Kumdi Pass, Pamir Range. |
| II5 | 15/632 | Biotite-granite, Hamta Pass, Lahaul. |
| II6 | 3/1045 | Gneissose-granite with inclusion of schist, Dalhousie Punjab. |
| II7 | 14/235 | Tourmaline-pegmatite, Hamta Pass, Kumaon. |
| II8 | 14/234 | Biotite-augen-gneiss, Almora, Kumaon. |
| II9 | 17/713 | Porphyritic granite, near Nam, Tibet. |

IGNEOUS ROCKS ASSOCIATED WITH THE PENINSULAR GNEISSES.

(a) The Charnockite Series.

THE name "Charnockite Series" was given by Sir Thomas Holland to a group of Archæan igneous rocks which contain, when typically developed, the mineral hypersthene. As is the case with many igneous rocks, the exposures of this series are generally foliated and sometimes banded. They resemble the pyroxene-granulites and pyroxene-gneisses of Europe and America.

In Southern India the charnockite series forms large mountain masses like the Nilgiris, the Shevaroyes and the Palnis. Generally, these rocks present a lenticular habit in the older gneisses and schists, but more rarely form true dykes.

By far the largest number of exposures of the charnockite series are *intermediate* in silica percentage, with about 63 per cent. of silica. Near Madras

there is a small hill formed of a mass of the acid variety, flanked by two masses of the typically *basic* form. The acid type, or charnockite proper, has a silica percentage of 74, and is composed of quartz, microcline, hypersthene and iron ores. The basic forms contain about 52 per cent. of silica and agree with norite in composition, containing hypersthene, plagioclase and iron ores with variable amounts of augite and hornblende. There are *ultra* basic, varieties of charnockite too, which are devoid of quartz and felspar, and are composed essentially of pyroxene (augite and hypersthene), sometimes with hornblende and small amounts of olivine, thus resembling the rocks known as pyroxenites. They form small lenses and bands in the commoner types.

Garnets occur in most exposures.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 120 | 11,930 | Garnetiferous charnockite, Salem District, Madras. |
| 121 | 9,670 | Charnockite, with graphite and garnet, Pallavaram, Madras. |
| 122 | 9,659 | Charnockite, with contemporaneous quartz-felspar veins, St. Thomas' Mount, Madras. |
| 123 | 8,573 | Charnockite, Pallavaram, Madras. |
| 124 | 12,791 | Charnockite, Coimbatore District, Madras. |
| 125 | 12,197 | Charnockite, Salem District, Madras. |
| 126 | 15,742 | Charnockite, Vizagapatam District, Madras. |
| 127 | 13,363 | Charnockite, intermediate variety, medium-grained, Coimbatore District, Madras. |
| 128 | 13,364 | Charnockite, intermediate variety, Coimbatore, Madras. |
| 129 | 12,149 | Charnockite, intermediate variety, Coimbatore, Madras. |
| 130 | 12,382 | Charnockite, intermediate variety, Coorg. |
| 131 | 11,915 | Charnockite, intermediate variety, Salem District, Madras. |
| 132 | 13,238 | Charnockite, intermediate variety, Salem District, Madras. |
| 133 | 12,386 | Charnockite, intermediate variety, Mercara, Coorg. |
| 134 | 12,399 | Fine-grained charnockite, Fraserpet, Coorg. |
| 135 | 12,395 | Basic hornblendic charnockite, Coorg. |
| 136 | 3,710 | Biotite-quartz norite, Pallavaram, Madras. |
| 137 | 3,711 | Hornblende-augite norite, Pallavaram, Madras. |
| 138 | 12,843 | Garnetiferous leptynite, Salem District, Madras. |
| 139 | 3,708 | Garnetiferous leptynite, Pallavaram, Madras. |
| 140 | 12,398 | Garnetiferous dyke rock (a variety of charnockite), near Fraserpet, Coorg. |
| 141 | 9,302 | Poikilitic pyroxene-plagioclase rock, lenticular inclusion in the Charnockite series, Coonoor, Nilgiri Hills. |
| 142 | 12,391 | Pyroxene with porphyritic bronzite, Yedinalkuam, Coorg. |

(b) ELÆOLITE-SYENITES AND AUGITE-SYENITES.

THE elæolite-syenites of the Coimbatore district of Madras form one of the most interesting of the igneous groups associated with the Archæan rocks of Peninsular India. They are exposed in a series of small hillocks stretching out from the larger mass of Sivamalai. The rocks are remarkable for their wonderful freshness and for the presence of graphite and calcite amongst their normal primary constituents. Augite-syenites frequently accompany the elæolite-syenites of Sivamalai.

Elæolite-bearing rocks occur also in the hill tracts of the Vizagapatam district of Madras, and at Kishengarh in Rajputana. In the latter place the rock contains a very singular form of sodalite. This mineral is either intensely blue, or else, under ordinary circumstances, colourless. Some specimens of the colourless variety, however, when broken open, are of a very vivid pink or

red tinge, which rapidly disappears. They are said to possess the remarkable property of again assuming the pink tinge after having been kept in the dark for a fortnight or three weeks. The colour vanishes again in a few seconds on exposure to bright daylight. No similar instance of this phenomenon has ever been observed in any mineral substance. Some of the elæolite-pegmatite veins attain a width of several yards, and yield continuous masses of this mineral of quite exceptional dimensions. Scapolite occurs with the pegmatites, the finer-grained syenite, and in the associated gneisses. The elæolite-pegmatite also contains large crystals of ægirine (soda-augite), sphene, and the lime-iron garnet, andradite.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 143 | 12,138 | Elæolite-syenite with graphite, Coimbatore District, Madras. |
| 144 | 11,460 | Elæolite-syenite with portion of a contemporaneous vein, Coimbatore District, Madras. |
| 145 | 11,470 | Mottled, gneissoid, elæolite-syenite, Coimbatore District, Madras. |
| 146 | 11,464 | Contemporaneous vein in elæolite-syenite, Sivamalai, Coimbatore District, Madras. |
| 147 | 13,234 | Contemporaneous vein of elæolite-felspar rock in elæolite-syenite, Sivamalai, Coimbatore District, Madras. |
| 148 | 13,236 | Elæolite lump, Sivamalai, Coimbatore District, Madras. |
| 149 | 11,463 | Augite-syenite, near Sivamalai, Coimbatore District, Madras. |
| 150 | 16,270 | Elæolite-sodalite-pegmatite, Kishengarh, Rajputana. |
| 151 | 3,480 | Sodalite, Kishengarh, Rajputana. |
| 152 | 16,271 | Ditroite-pegmatite with biotite, Kishengarh, Rajputana. |
| 153 | 30,240 | Calcite and cancrinite with zoisite and vesuvianite. |

(c) ÆGIRINE-GRANITE AND AUGITE-SYENITE.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 154 | 11,400 | Ægirine-granite, Uttamkarai, Salem District, Madras. |
| 155 | 11,406 | Augite-syenite, Uttamkarai, Salem District, Madras. |
| 156 | 11,420 | Pyroxene-biotite-apatite-sphene rock, an ultra-basic segregation in augite-syenite, Salem District, Madras. |
| 157 | 11,408 | Augite-syenite with sphene, Salem District, Madras. |
| 158 | 11,415 | Wollastonite-melanite-fassaite rock, contact product of ægirine-granite, Salem District, Madras. |

(d) ANORTHOSITES AND MASSIVE NORITES.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 159 | 13,827 | Coarse-grained anorthosite, Raniganj, Bengal. |
| 160 | 13,829 | Granulitic fine-grained norite, associated with anorthosites as basic schlieren, Raniganj, Bengal. |
| 161 | 13,826 | Fine-grained anorthosite, Raniganj, Bengal. |
| 162 | 13,830 | Junction of labradorite rock and granulitic norite, Raniganj, Bengal. |
| 163 | 12,406 | Coarse-grained norite with pink labradorite, Yedinalkuad, Coorg. |
| 164 | 12,409 | Augite-norite with glomero-porphyrite patches, Tellicherri, Coorg. |
| 165 | 12,408 | Augite-norite, granulitic variety, Tellicherri, Coorg. |

(e) PEGMATITES AND ASSOCIATED MINERALS.

THE coarse-grained, contemporaneous veins of pegmatite which traverse the crystalline rocks of the Indian Peninsula, are probably end-products of the differential consolidation of the magmas from which the associated massive granites, syenites and diorites were derived. They are also found traversing mica-schists, quartzites and other schistose rocks in various parts of Bihar and Orissa, the Central Provinces, Madras, Rajputana and elsewhere.

By far the majority of the pegmatites are composed, like ordinary granite, of quartz, felspar and mica, but, on account of the gigantic scale on which the crystals have developed, many comparatively rare minerals have been found in the pegmatites which have not been noticed in ordinary granite, perhaps because of the normally small size of the crystals of accessory minerals in the latter rock; others, again, are possibly peculiar to the pegmatites, and are due to the special conditions under which the veins have been formed. The pegmatites which contain muscovite mica in large crystals, are mined extensively for that mineral in the Hazaribagh district of Bihar and Orissa, and in the Nellore district of Madras.

Specimens of these are exhibited in the Economic Section of the collection under "Rare Minerals," "Mica" and "Phosphates."

Amongst the minerals which have been obtained from Indian granite pegmatites, the following may be mentioned:—Albite, allanite, amazon-stone, apatite, automolite, beryl, lepidolite, leucopyrite, magnetite, pitchblende, monazite, samarskite, gadolinite, garnet, ilmenite, kyanite, staurolite, tourmaline, triplite and uranium ochre.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 166 | 13,657 | Pegmatite with apatite, Hazaribagh District, Bihar and Orissa. |
| 167 | 13,550 | Pegmatite with garnet and altered allanite, Nellore District, Madras. |
| 168 | 13,523 | Apatite in pegmatite, Nellore District, Madras. |
| 169 | 186 | Apatite in pegmatite, Hazaribagh District, Bihar and Orissa. |
| 170 | 18,713 | Muscovite-quartz rock with magnetite, Nagpur District, Central Provinces. |
| 171 | 11,417 | Albite as mammilated incrustations on microcline, Coimbatore District, Madras. |
| 172 | 13,506 | Perthite, Tellabodu mica mine, Nellore District, Madras. |
| 173 | 13,534 | Rubellite on felspar, Nellore District, Madras. |
| 174 | 13,518 | Intergrowth of felspar and muscovite, Nellore District, Madras. |
| 175 | 13,505 | Microcline on amazon stone, near Gudur, Madras. |
| 176 | L. 686 | Crystal of microcline, Hazaribagh District, Bihar and Orissa. |
| 177 | K. 148 | Crystal of quartz, Vizagapatam District, Madras. |
| 178 | 13,650 | Lepidolite, Hazaribagh District, Bihar and Orissa. |
| 179 | K. 826 | Crystal of tourmaline, Hazaribagh District, Bihar and Orissa. |
| 180 | J. 216 | Broken crystal of tourmaline cemented by quartz. |
| 181 | 2,192 | Green tourmaline and quartz, Hazaribagh District, Bihar and Orissa. |
| 182 | 13,677 | Green tourmaline in quartz, Hazaribagh District, Bihar and Orissa. |

| Serial No. | Reg. No. | Description. |
|---------------|-------------|--|
| r83 | 13,660 | Beryl, Monghyr District, Bihar and Orissa. |
| r84 | K. 830 | Beryl, Singhbhum District, Bihar and Orissa. |
| r85 | L. 332 | Crystal of beryl, Nansa, Udaipur State, Rajputana. |
| r86 | 13,520 | Beryl, Polimitta mica mine, Nellore District, Madras. |
| r87 | 13,654 | Leucopyrite, Hazaribagh District, Bihar and Orissa. |
| r88 | 13,539 | Automolite in quartz, Nellore District, Madras. |
| r89 | 13,542 | Massive staurolite in pegmatite, Nellore District, Madras. |

(f) PERIDOTITES AND ASSOCIATED ROCKS OF THE PENINSULA.

| Serial No. | Reg. No. | Description. |
|---------------|-------------|--|
| r90 | 12,419 | Dunite, partially decomposed, Nanjarajpatna, Coorg. |
| r91 | 12,423 | Picrite, Nanjarajpatna, Coorg. |
| r92 | M. 2,246 | Picrolite, "Chalk Hills," Salem District, Madras. |
| r93 | 9,688 | Dunite with magnesite and serpentine, "Chalk Hills," Salem District, Madras. |
| r94 | 1,274 | Serpentine, Salem District, Madras. |
| r95 | 1,044 | Poikilitic mica-peridotite, intrusive in the Lower Gondwanas, Giridih coalfield, Bihar and Orissa. |
| r96 | 10,772 | Mica-apatite-peridotite, intrusive in the Lower Gondwanas, Giridih, Bihar and Orissa. |
| r97 | 3,454 | Serpentine rock, formed from dunite, Singhbhum District, Bihar and Orissa. |
| r98 | 3,459 | Serpentine rock, Singhbhum District, Bihar and Orissa. |
| r99 | 31,760 | Serpentine Rock, Singhbhum District, Bihar and Orissa. |
| 200 | 3,462 | Green, fibrous serpentine, Singhbhum District, Bihar and Orissa. |
| 201 | 3,463 | Chrysolite asbestos, Singhbhum District, Bihar and Orissa. |
| 202 | 3,455 | Serpentine with green veins, Singhbhum District, Bihar and Orissa. |
| 203 | 29,449 | Pale green and banded purple serpentine, Idar State, Bombay. |
| 204 | 13,594 | Silicified serpentine with noble serpentine, Hazaribagh District, Bihar and Orissa. |

POST-ARCHÆAN DYKE ROCKS.

THE Archæan rocks of the Indian Peninsula are often traversed by dyke rocks of various kinds and of later dates. Some of these, such as the quartz porphyries, euries and granophyres, are of an acid character. Commoner than these, however, are the numerous basic dykes. They are believed to be the underground representatives of lava flows like those of the Cuddapah, Rajmahal and Deccan formations. The dykes now exposed at the surface were once covered by volcanic lava flows and other rocks which have been removed by denudation.

According to Sir Thomas Holland, the older dykes of Southern India are referred to the following three types—olivine-norites, augite-norites and augite-diorites (diabases)—though they are connected with one another by intermediate varieties. The olivine-norites are characterised by the presence of olivine, enstatite, augite and plagioclase, with smaller quantities of biotite, apatite and magnetite. The augite-norite types, which form a link between the two other extremes, are characterised by the absence of olivine and the

abundance of enstatite. The augite-diorites, composed of augite, plagioclase and micropegmatite, are often very fine-grained, especially near their edges, which sometimes have a glassy ground-mass resembling that which occurs in the rocks known as augite-porphyrity and augite-andesite.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 205 | 13,494 | Quartz-porphyrity, Gilkapad, Nellore District, Madras. |
| 206 | 7,640 | Eurite, Marwar Rajputana. |
| 207 | 13,703 | Granophyre, Raipur District, Central Provinces. |
| 208 | 13,703 | Porphyritic granophyre, Raipur District, Central Provinces. |
| 209 | 11,996 | Olivine-norite, Coorg. |
| 210 | 11,352 | Dyke of compact olivine-norite with a thin branch in pyroxene-granulite, Nilgiri Hills, Madras. |
| 211 | 11,912 | Augite-norite, Salem District, Madras. |
| 212 | 13,672 | Diabase, augite-plagioclase rock with granular hornblende, Monghyr District, Bihar and Orissa. |
| 213 | 12,417 | Diabase, changing to epidorite, with large quartz inclusions, Monghyr District, Bihar and Orissa. |
| 214 | 13,486 | Olivine-diabase, Nellore District, Madras. |
| 215 | 13,489 | Olivine-diabase, with green felspar, Nellore District, Madras. |
| 216 | 13,484 | Garnetiferous plagioclase-hornblende rock, Nellore District, Madras. |
| 217 | 13,485 | Hornblende-gabbro, Nellore District, Madras. |
| 218 | 12,434 | Olivine-diabase, Nanjarajpatna, Coorg. |
| 219 | 3,092 | Coarse diorite, Chhindwara District, Central Provinces. |

THE DECCAN TRAP.

SOME idea of the extensive area occupied by this great volcanic formation, which was poured forth in the interval between Middle Cretaceous and Middle Eocene times, may be gained from the fact that the railway from Bombay to Nagpur, 519 miles long, never leaves the volcanic rocks. There is proof of its existence throughout nearly ten degrees of latitude and 16 of longitude. In the Indian Peninsula to-day it covers approximately 200,000 square miles.

Throughout this vast region the prevailing rock is some form of dolerite or basalt, but there is much variety in the characters presented by the different flows. Some are compact, hard and homogeneous, others are soft and earthy. Some contain olivine in considerable quantity, others have porphyritic felspars, Many of the rocks are amygdaloidal, and the commonest minerals found in the cavities are quartz (either crystalline or in the form of agate, bloodstone, jasper, onyx, etc.), zeolites, such as stilbite, apophyllite, heulandite, scolecite, laumontite, okerite, chabasite, etc., and calcite. The presence of glauconite, or green earth, as a coating to the nodules is highly characteristic.

Over the greater portion of their area the Deccan traps are persistently horizontal, and form undulating plains divided from each other by terraced and flat-topped ranges of hills. Fossiliferous sedimentary beds of fresh water origin are often intercalated between the flows.

The specimens are from Bombay, Central India and the Central Provinces, and are normal varieties of the rocks themselves.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 220 | 14,913 | Basalt of the Deccan Trap, Jakhmari, Lower Sind. |
| 221 | 14,915 | Basalt of the Deccan Trap, Ranikot, Sind. |
| 222 | 14,917 | Basalt of the Deccan Trap, near Ranikot, Sind. |
| 223 | 21,621 | Deccan Trap, Kusalgarh, Rajputana. |
| 224 | 21,622 | Deccan Trap, Kusalgarh, Rajputana. |
| 225 | 21,687 | Deccan Trap, Pertabgarh, Rajputana. |
| 226 | 29,347 | Deccan Trap basalt, Hyderabad, Deccan. |
| 227 | 1,155 | Vesicular basalt, Chhindwara District, Central Provinces. |
| 228 | 1,157 | Vesicular basalt, Chhindwara District, Central Provinces. |
| 229 | 1,158 | Compact basalt, Chhindwara District, Central Provinces. |
| 230 | 3,521 | Basalt (Flow No. 2), Chhindwara, Central Provinces. |
| 231 | 1,156 | Basalt (Flow No. 1), Chhindwara, Central Provinces. |
| 232 | 3,520 | Basalt (Flow No. 2A), Chhindwara, Central Provinces. |
| 233 | 1,153 | Vesicular Trap, Chhindwara, Central Provinces. |
| 234 | 3,518 | Olivine basalt, Chhindwara, Central Provinces. |
| 235 | 29,574 | Deccan Trap basalt, Hoshangabad, Central Provinces. |
| 236 | 29,573 | Deccan Trap basalt, Hoshangabad, Central Provinces. |
| 237 | 19,254 | Basalt of the Deccan Trap, Bhopal, Central India. |
| 238 | 17,945 | Basalt of the Deccan Trap, Bhopal, Central India. |
| 239 | 17,923 | Basalt of the Deccan Trap, Bhopal, Central India. |
| 240 | 17,958 | Fine-grained basalt, Bhopal, Central India. |
| 241 | 19,819 | Coarse-grained basalt, Sonkach, Central India. |
| 242 | 19,825 | Coarse-grained basalt, Dewas State, Central India. |

RECENT VOLCANIC ROCKS FROM REGIONS ADJOINING INDIA

THE Indian Empire only possesses one volcano, that of Barren Island, in the Bay of Bengal, which has been in active eruption within the century, but in the west, on the south-eastern borders of Persia and Baluchistan, and on the east, both in Burma and the Chinese province of Yunnan, there are others that have been active in Tertiary and recent times.

The great volcano of Koh-i-Tafdan in Persia, which is believed to exceed the dimensions of Etna, still gives forth clouds of vapour, and is probably in the "solfataric" stage. Koh-i-Sultan, in a most inaccessible position in the heart of the Baluchistan desert, is extinct. It possesses three distinct and denuded cones, and its lava flows over an area of about 150 square miles. These, and other smaller cones, are but the extension of a large volcanic district, which occupies a great part of Eastern Persia.

The volcanic chain on the east of India, which commences in Barren Island, continues through Narcondam, Mount Popa, which rises to a height of 3,000 feet above the undulating Tertiary plains of Burma, and Loi-han-hun in the Northern Shan States, to the group of craters around Têng-yüeh in Yunnan. This line is believed to constitute the northerly prolongation of the Sunda volcanic chain running through Java and Sumatra. The geographical alignment is supported by the petrological composition of the bulk of the rocks, which is typically as follows:—Java and Sumatra, chiefly andesites with some leucite rocks; Barren Island, chiefly olivine basalts; Narcondam, hornblende-andesites; Mount Popa, augite-andesites; Loi-han-hun, olivine-basalts; Têng-yüeh area, andesites and olivine-basalts.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 243 | 13,841 | Latest lava flow of the Koh-i-Tafdan. An andesite containing pyroxene and hornblende. |
| 244 | 13,892 | Pumice, Koh-i-Sultan, Baluchistan desert. |

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 245 | 11,119 | Augite-andesite, Mount Popa, Burma. |
| 246 | 27,387 | Augite-andesite, Mount Popa, Burma. |
| 247 | 33,299 | Augite-andesite, Mount Popa, Burma. |
| 248 | 27,371 | Altered andesite lava, Mount Popa, Burma. |
| 249 | 26,161 | Augite-andesite, Kan-lan-ssu, Yunnan. |
| 250 | 21,690 | Pumice, Têng-yüeh District, Yunnan. |
| 251 | 21,698 | Pumice-like lava, Têng-yüeh District, Yunnan. |

ROCKS FROM THE GIRIDIH COALFIELD.

THE small but important coalfield of Giridih is situated in the Hazaribagh District of Bihar and Orissa, at a distance of about 200 miles from Calcutta by rail. It is of great importance, both on account of its position and the quality of its coal. The total area of the field is only 11 square miles, of which 7 square miles are occupied by coal-bearing rocks—the Barakar stage of the Damuda series, a division of the great Gondwana system. These are faulted down into crystalline strata of archæan age.

The lowest sub-division of the Gondwana system, known as the Talchir series, is present in the Giridih field. It consists of basalt conglomerates, shaly sandstones and greenish, silty shales, which break up into small angular fragments. The series does not contain coal.

Of the three groups of the Damuda series—(a) Raniganj, (b) Ironstone Shales, and (c) Barakar—only the lower one, the Barakar, is represented. It consists of alternations of grits, pebbly beds, and sandstones with many seams of coal of varying thickness and quality. The bulk of the workable coal, however, is contained in the Karharbari lower seam, which has a thickness of about 15 feet.

There are large numbers of igneous dykes, and their contact effects have destroyed many thousands of tons of coal. The most destructive are composed of mica-peridotite, whilst the widest are of basalt.

Talchir Series.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 252 | 33,306 | Clay. Presented by the East Indian Railway Company. |
| 253 | 7,209 | Clay. |
| 254 | 33,301 | Shale. |
| 255 | 1,366 | Silt shale. |

Barakar Series.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 256 | 6,999 | Coal shale, Karharbari Colliery. |
| 257 | 9,889 | Micaceous shale near lower seam, Sariabad Pit. |
| 258 | 9,890 | Compact micaceous sandstone, 16A Shaft, East Indian Railway Co.'s Collieries. |
| 259 | 9,886 | Sandstone, above lower seam, Sariabad Pit. |
| 260 | 9,887 | Sandstone, above lower seam, Sariabad Pit. |
| 261 | 9,893 | Micaceous, carbonaceous and felspathic grit from thin band above lower seam, Sariabad Pit. |
| 262 | 9,891 | Micaceous sandstone, 250 ft. above lower seam, Paharidih. |
| 263 | 13,772 | Dressed block of sandstone, with coal films, 50 ft. above upper seam, Serampur Colliery. |
| 264 | 13,765 | False-bedded sandstone, 50 ft. below upper seam, Serampur Colliery. |

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 265 | 13,764 | Sandstone with coal films, 50 ft. below upper seam, Serampur Colliery. |
| 266 | 13,763 | Micaceous and carbonaceous sanstone, floor of upper seam, Serampur Colliery. |
| 267 | 13,761 | Conglomeratic sandstone, Serampur Colliery. |
| 268 | 9,894 | Carbonaceous felspathic grit, underlying the Khandiha top seam, Serampur Colliery. |

Igneous Rocks and Contact Products.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 269 | 9,197 | Eurite, intrusive along the northern boundary fault, Karharbari. |
| 270 | 3,010 | Eurite, northern boundary, Giridih. |
| 271 | 10,772 | Highly phosphatic mica-peridotite, from a dyke traversing the coal measures, Jogitand. |
| 274 | 9,873 | Claystone, produced by atmospheric decomposition of peridotite, outcrop of dyke at Bittagarh. |
| 273 | 9,885 | Sandstone, partially fused by peridotite intrusions, Bhaddoah Hill. |
| 274 | 91,043 | Sandstone, baked and hardened near junction of Barakars, with thin dyke of peridotite, Lunki Hill. |
| 275 | 13,760 | Sandstone, partially fused near small peridotite laccolite, Bittagarh. |
| 276 | 91,044 | Junction of compact sandstone and peridotite, Lunki Hill. |
| 277 | 14,248 | Large block showing junction of peridotite dyke with partially fused sandstone, Bhaddoah Hill. Presented by the East Indian Railway Co., Ltd. |
| — | 10,773 | Peridotite with inclusions of fused sandstone, Jogitand Shaft. |
| 278 | 9,877 | Selvage of peridotite dyke, with included lumps of altered coal, Bittagarh Pit. |
| 279 | 6,930 | Strings of decomposed peridotite in pyramidal coke, Shaft 23D, East Indian Railway Co.'s Collieries. |
| 280 | 10,774 | Ash of coal seam which has been accidentally set on fire, Khandida. |
| 281 | 3,017 | Basalt, Giridih. |
| 282 | 9,881 | Olivine-basalt from dyke of Rajmahal age, cutting the lower Gondwana rocks, Komaljore Dyke. |
| 282 | 9,882 | Olivine-basalt from dyke of Rajmahal age, cutting the lower Gondwana rocks, Kabribad Dyke. |

STRIATED AND FACETTED BOULDERS.

AT the base of the Productus Limestone series of the Salt Range, resting unconformably on Cambrian strata, is a boulder clay formed of a fine-grained matrix of shale, through which are scattered blocks of hard rock, ranging to several cubic feet in size, almost invariably subangular, and frequently showing faces that have been smoothed, polished and striated in the manner characteristic of glacial action. Included amongst them are others with facettled faces, indicating that after one face had been ground and smoothed the boulder was shifted slightly and offered a fresh surface to the process of attrition.

A boulder bed has been found in a similar stratigraphical position in Kashmir, and it is reasonable to suppose that the extreme cold which affected one area also affected the other in Upper Carboniferous times.

At the base of the Talchir group, that is to say, at the bottom of the Gondwana system of Peninsular India, peculiar boulder beds occur whose special characters are best explained by the assumption of ice action. The boulders vary from pebbles to blocks weighing many tons. They are generally well rounded and rarely scratched, lying often in a matrix of fine silt. The surface of the limestone rock, underlying the Talchirs on the banks of the Penganga River, from which one of the specimens comes, is polished, scratched and grooved by ice action.

It is believed that the Salt Range Boulder Bed corresponds to, and is probably contemporaneous with, that of the Talchir group. On the latter the fresh water sediments were laid down in the great river valleys of the old Gondwana continent; on the former the marine deposits of the Salt Range were deposited at about the same time in the adjoining ocean.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 284 | 9,387 | Striated pebble of magnesian sandstone, Boulder Bed, North of Khusak Fort, Salt Range, Punjab. |
| 285 | 9,386 | Striated boulder of "Purple Sandstone," Boulder Bed, North of Khusak Fort, Salt Range, Punjab. |
| 286 | 8,315 | Striated boulder, eastern part of the Salt Range, Punjab. |
| 287 | 8,485 | Striated boulder, Mount Chel, Salt Range, Punjab. |
| 288 | 8,313 | Striated boulder, eastern part of the Salt Range, Punjab. |
| 289 | 1,412 | Striated boulder from the Talchir Series, near junction of the Pen and Wardha Rivers, Central Provinces. |

CLASS II. MINERALS.

GROUP I. ORES.

| | | | | | | |
|-------------------|----|----|----|----|----|----|
| Ores of Aluminium | .. | .. | .. | .. | .. | .. |
| Do. Antimony | .. | .. | .. | .. | .. | .. |
| Do. Arsenic.. | .. | .. | .. | .. | .. | .. |
| Do. Chromium | .. | .. | .. | .. | .. | .. |
| Do. Copper | .. | .. | .. | .. | .. | .. |
| Do. Gold .. | .. | .. | .. | .. | .. | .. |
| Do. Iron .. | .. | .. | .. | .. | .. | .. |
| Do. Lead .. | .. | .. | .. | .. | .. | .. |
| Do. Silver | .. | .. | .. | .. | .. | .. |
| Do. Zinc .. | .. | .. | .. | .. | .. | .. |
| Do. Manganese | .. | .. | .. | .. | .. | .. |
| Do. Molybdenum | .. | .. | .. | .. | .. | .. |
| Do. Tin .. | .. | .. | .. | .. | .. | .. |
| Do. Titanium | .. | .. | .. | .. | .. | .. |
| Do. Tungsten | .. | .. | .. | .. | .. | .. |
| Do. Zirconium | .. | .. | .. | .. | .. | .. |

CLASS II MINERALS.

GROUP I. METALLIC ORES.

ALUMINIUM.

SPECIMENS are exhibited illustrating the indigenous methods of manufacturing alum from pyritous shale—at one time a flourishing industry. It has now practically collapsed before foreign competition, but still lingers on, however, in the Mianwali District of the Punjab.

Some years ago it was shown that the laterite deposits of India, those curious, residual weathered products of various types of rocks which cover

so large a proportion of the surface of the Peninsula, are highly aluminous, and that in many places they possess the composition of bauxite, the ore of aluminium. Recent investigations by the Geological Survey of India have proved that certain of these deposits compare very favourably, both as regards quality and quantity, with those worked on a large scale in the United States of America, France, British Guiana and elsewhere.

The richest bauxite-bearing areas of India are situated in the Balaghat district and in the neighbourhood of Katni, both in the Central Provinces. In addition to these, valuable ores have been found in the States of Sarguja and Jashpur, and in the districts of Mandla and Seoni, Central Provinces; in the Kalahandi State and Chota Nagpur, Bihar and Orissa; in Bhopal and Rewah States, Central India; in the Satara, Kaira and other districts of Bombay; in Mysore; in Kashmir and elsewhere.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 290 | I 494 | Alum shale, Kadji, Mianwali District, Punjab. |
| 291 | I 507 | Alum shale, Kalabagh, Punjab. |
| 292 | G 899 | Alum shale, Mharr, Kachh, Bombay. |
| 293 | G 903 | Potash alum made from G 899. |
| 294 | H 852 | Indian-made potash alum, Khetri, Jaipur, Rajputana. |
| 295 | G 893 | Alum shale, Dikhu Valley, Assam. |
| 296 | 3,029 | Pisolitic bauxite, Ranchi District, Bihar and Orissa. |
| 297 | 3,030 | Do. do. do. |
| 298 | 3,032 | Do. do. do. |
| 299 | 3,035 | Do. do. do. |
| 300 | 3,040 | Do. do. do. |
| 301 | 806 | Do. do. do. |
| 302 | 739 | Compact bauxite, Amarkantak, South Rewah, Central India. |
| 303 | 719 | Pisolitic bauxite, Radhanagri, Kolahapur State, Bombay. |
| 304 | 3,041 | Pisolitic bauxite, Jabalpur District, Central Provinces. |
| 305 | 841 | Compact bauxite, Belgaum District, Bombay. |
| 306 | 1,967 | Bauxite laterite, Badarkhir, Bhopal State, Central India. |
| 307 | 141 | Pisolitic, ferruginous bauxite, Amarkantak, South Rewah, Central India. |
| 308 | 733 | Lateritic bauxite, Amarkantak, South Rewah, Central India. |
| 309 | 3,063 | Laterite, Palamau District, Bihar and Orissa. |
| 310 | 3,012 | Laterite, Ranchi District, Bihar and Orissa. |

ANTIMONY.

STIBNITE, the sulphide of antimony, has been found in many parts of India, but the deposits have proved to be of too low grade, or too isolated as regards cheap transport to be worked continuously. Small quantities are mined during periods of exceptional demand or of high prices.

The largest occurrences are probably those of Thabyu, near the Siamese frontier of the Amherst District of Burma. Stibnite has also been reported from the Thaton District and from various localities in the Southern Shan States.

Antimonial lead, containing from 15 to 20 per cent. of metallic antimony, is produced as a by-product at the Nam Tu smelters of the Burma Corporation, Limited; and parcels of this alloy come on to the market from time to time.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 311 | 989 | Stibnite, Burma. |
| 312 | L.364 | Stibnite, Southern Shan States, Burma. |
| 313 | L.362 | Stibnite in breccia, Southern Shan States, Burma. |
| 314 | L.366 | Stibnite in grey siliceous rock, Southern Shan States, Burma. |
| 315 | L.359 | Stibnite, Southern Shan States, Burma. |

ARSENIC.

ORPIMENT, the golden-yellow sulphide of arsenic, is mined in Chitral, a State which lies on the southern flanks of the Hindu Kush Range, to the north of the North-West Frontier Province. Small quantities also find their way into the bazaars of Northern India from Kumaon. The mineral has been imported into Burma from the Chinese province of Yunnan for scores of years. It is extensively used as a pigment, and, when mixed with indigo, it yields the well-known green tints which are used to adorn Burmese lacquered articles.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 316 | M.318 | Orpiment, Chitral, North-West Frontier Province. |
| 317 | M.319 | Realgar with orpiment, Aligot Mines, Chitral, North-West Frontier Province. |
| 318 | K.271 | Orpiment, Chitral, North-West Frontier Province. |
| 319 | K.139 | Orpiment, Kumaon, Almora District, United Provinces. |

CHROMITE.

CHROMITE, or chrome iron ore, is the source of ferro-chrome, chromium and the commercial chromates. Ferro-chrome is extensively used in the manufacture of the "chrome," "rustless" and "stainless" steels. Chromite is also a very important refractory material for lining the hearths of steel, lead and copper furnaces.

The world's supplies are mainly derived from India, Rhodesia and New Caledonia, but there are other deposits in Asiatic Turkey, Canada, Cuba and elsewhere. In India the largest mines are near Hindubagh, in the Zhob Valley of Baluchistan, where the mineral occurs in veins and segregations of remarkable purity and constancy of composition, associated with serpentine. Again, in the Mysore State of Southern India, there are large deposits in the Shimoga, Hassan and other districts. The mineral also occurs in the Singhbhum District of Bihar and Orissa, and in Burma.

In 1918 India's output of chromite aggregated 57,000 tons. In 1922 it was 22,700 tons.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 320 | M.978 | Large mass of solid chromite, Hindubagh, Zhob Valley, Baluchistan. Presented by the Baluchistan Chrome Co., Ltd. |
| 321 | L.978 | Chromite, Hindubagh, Baluchistan. Presented by the Baluchistan Chrome Co., Ltd. |
| 322 | 10,151 | Chromite, Salem District, Madras. |
| 323 | 3,445 | Chromite, Singhbhum District, Bihar and Orissa. |
| 324 | 31,751 | Chromite, Singhbhum District, Bihar and Orissa. |
| 325 | 6,618 | Chromite sand, Rutland Island, Andaman Islands. |

COPPER.

COPPER ores have been smelted in India since prehistoric times, and minerals containing the metal are widespread. In the Singhbhum District of Bihar and Orissa there is a copper-bearing zone, demarcated by ancient workings and persistent for 80 miles. In the years 1906-1908 certain selected places were drilled by the Geological Survey of India. The results obtained led to the exploratory work of the Cape Copper Co., Ltd., which has proved the existence of large reserves of ore. Copper smelting commenced at Rakha in 1918, and 1,037 tons of refined copper were made in 1922. The Rakha Mines deposit consists of a low-grade sulphide ore containing from 2 to 4 per cent. of copper, but a slightly higher grade of ore has been found recently. Three other companies are prospecting in the Singhbhum belt at present, and in one place a 10 to 12 per cent. ore has been obtained. Typical specimens of the richer ores are exhibited.

Copper ores are also known to occur in the Hazaribagh District of Bihar and Orissa and in the sub-Himalayan tract of Kumaon, a division of the United Provinces.

Copper-bearing lodes of possible value have been found at a number of places in the Himalayan State of Sikkim, and their origin and mode of occurrence appear to be somewhat similar to those of the copper lodes of Singhbhum. The two largest deposits are at Bhotang and Dikchu respectively.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 326 | 3,438 | Chalcopyrite, Singhbhum District, Bihar and Orissa. |
| 327 | M.10 | Copper ores, mainly chalcopyrite, Mosaboni Mine, Singhbhum District, Bihar and Orissa. Presented by the Cordova Copper Co., Ltd. |
| 328 | M.11 | Oxidised copper ores, Mosaboni Mine, Singhbhum District, Bihar and Orissa. Presented by the Cordova Copper Co., Ltd. |
| 329 | M.12 | Chalcopyrite in schist, Singhbhum District, Bihar and Orissa. Presented by the Cordova Copper Co., Ltd. |
| 330 | F.23 | Bornite, chalcopyrite and galena in coccolite, garnet, etc., Hazaribagh District, Bihar and Orissa. |
| 331 | L.253 | Oxidised copper ore, Bhagalpur District, Bihar and Orissa. |
| 332 | 5,246 | Azurite and malachite with quartz, Narbada Valley, Central Provinces. |
| 333 | L.732 | Chalcopyrite, Bawdwin Mines, Northern Shan States, Burma. |
| 334 | 317 | Cuprite and malachite. Presented by the Director of Industries, Madras. |
| 335 | H.513 | Copper as taken from the smelting furnace, Alwar State, Rajputana. |
| 336 | H.278 | Copper, smelted by the ancients, Singhbhum District, Bihar and Orissa. Found in old mine workings and presented by the Cordova Copper Co., Ltd. |
| 337 | L. 36 | Copper, smelted by Chinese from erubescite and chalcopyrite, Pao-ping-chang, Yunnan. |
| 338 | M.420 | Copper ore, Bawdwin Mines, North Shan States, Burma. Presented by the Burma Corporation, Ltd. |

GOLD.

SPECIMENS of auriferous quartz from the famous goldfield of Kolar in Mysore are exhibited. Here there is only one vein, averaging about 4 ft. in thickness, and profitable to work for a distance of little more than 4 miles, yet, from the commencement of European mining in 1822 to the end of 1922, it has yielded gold bullion of a total value of over £58,600,000. At the present time there are five companies at work, finding employment for about 25,000 persons, and disbursing annually over 11 lakhs of rupees in wages alone. Many of the workings are of great depth, attaining in 1921 a maximum of 4,890 ft. below the surface.

Outside Mysore the only areas in which gold-bearing quartz veins have been mined on a large scale in recent years are those of Hutti in Hyderabad, Dharwar in Bombay, Kyaukpazat in the Katha District of Burma, Dhalbhum in Orissa, and Anantapur in Madras. With the exception of the latter, all these are now abandoned.

Alluvial gold is found in the sands of many Indian rivers, especially those of Assam, Burma, Bihar and Orissa, the Central Provinces and Mysore, and small amounts are regularly won by indigenous gold washers. In no case, however, have the alluvial deposits as yet proved rich enough to be profitably exploited by modern methods.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 339 | 9.378 | Auriferous quartz with pyrite, Kolar Goldfield, Mysore. |
| 340 | 9.403 | Auriferous quartz with galena, Nundydroog Mine, Kolar Goldfield, Mysore. |
| 341 | H.682 | Auriferous quartz, Wynaad Malabar District, Madras. |
| 342 | F.III | Auriferous quartz, Nilgiri District, Madras. |
| 343 | I.590 | Auriferous quartz with pyrite, Singhbhum District, Bihar and Orissa. |

IRON.

THE iron ore deposits of the Indian Empire may be divided into three groups, as follows:—

1. Banded rocks composed of iron ore and quartz, associated with other rocks of Dharwar age. These deposits supply the ores which are being smelted to-day. The better known occurrences are in Singhbhum and the Feudatory States of Orissa, in the Central Provinces, and in Mysore.

2. Bands of clay ironstone found in the coalfields of Bengal, Bihar and Orissa.

3. Surface ores formed by the segregation of iron oxides in a tropical climate. These were employed in the past by the old Indian iron makers.

Specimens from each of these groups are exhibited, and with the latter are examples of the finished iron and steel made in various parts of India by indigenous workers using the crudest appliances.

The huge iron ore deposits of Singhbhum, and the Keonjhar, Bonai and Mayurbhanj States of Orissa, lie from 150 to 200 miles west of Calcutta, and are remarkable for the enormous quantities of extremely rich ore they contain. They will undoubtedly prove to be amongst the largest and richest deposits in the world. The minimum quantities, estimated up to the present, of hæmatite, containing not less than 60 per cent. of iron, are 2,832,000,000 tons on a conservative basis.

Iron and steel manufacture is now established in India on sure foundations, the companies working at present being the Bengal Iron Co., Ltd., the Tata Iron and Steel Co., Ltd., the Indian Iron and Steel Co., Ltd. In addition to these, the Mysore State manufactures charcoal iron from the ores of the

Bababudan Hills. Various products from the blast-furnaces and foundries of the Bengal Iron Co., Ltd., and the charcoal iron manufactured by the Mysore State are exhibited.

| Serial No. | Reg. No. | Description. |
|------------|-----------|--|
| 344 | I.418 | Clay ironstone, Ironstone Shales, Bengal. |
| 345 | I.722 | Fibrous limonite with botryoidal surface, Porahat, Chota Nagpur, Bihar and Orissa. |
| 346 | 7.750 | Limonite clay ironstone, Palamau, Bihar and Orissa. |
| 347 | I.346 | Micaceous iron ore, Chota Nagpur, Bihar and Orissa. |
| 348 | E.102 | Rough, locally made iron, Gaya District, Bihar and Orissa. |
| 349 | G.956 | Pisiform limonite, Kokshing, Manipur. |
| 350 | G.957 | Iron manufactured locally from G.956. |
| 351 | G.958 | Iron manufactured locally from G.956. |
| 352 | G.960 | Magnetite sand, washed and ready for the furnace, Cherrapunji, Assam. |
| 353 | I.946 | Iron produced by Khasias from magnetite sand No. G.960, Cherrapunji, Assam. |
| 354 | I.945 | Iron produced from G.960. |
| 355 | I.952 | Iron produced from G.960. |
| 356 | I.954 | Iron made at Golaghat, Assam. |
| 357 | H.110 | Manganiferous clay ironstone, Narsingpur, Central Provinces. |
| 358 | H.111 | Rough iron produced locally from H.110. |
| 359 | H.113 | Finished iron produced locally from H.111. |
| 360 | F.151 | Pisolitic limonite, Jabalpur District, Central Provinces. |
| 361 | I.995 | Manganiferous hæmatite schist, Jabalpur District, Central Provinces. |
| 362 | F.133 | Manganiferous hæmatite, Jabalpur District, Central Provinces. |
| 363 | F.137 | Pisolitic limonite, Jabalpur District, Central Provinces. |
| 364 | F.139 | Pisolitic limonite, Jabalpur District, Central Provinces. |
| 365 | H.121 | Magnetite with limonite, Chanda District, Central Provinces. |
| 366 | M.882 | Magnetite, Narbada Valley, Central Provinces. |
| 367 | 8,829 | Clay ironstone, Gwalior State, Central India. |
| 368 | F.178 | Hæmatite, Singarenni Coalfield, Hyderabad. |
| 369 | J.338 | Iron ore ready for the furnace, Ernad, Malabar District, Madras. |
| 370 | J.335 | Iron made by Moplahs from J.338. |
| 371 | J.336 | Iron made by Moplahs, Malabar District, Madras. |
| 372 | J.337 | Iron made by Moplahs, Malabar District, Madras. |
| 373 | J.339 | Slag from the Moplah iron furnaces. |
| 374 | F.180 | Rough iron made from magnetite gravel, Hyderabad. |
| 375 | F.181 | Finished iron made from F.180. |
| 376 | 5.323 | Clay ironstone, Raigarh Coalfield, Central Provinces. |
| 377 | 5.323 (a) | Rough iron produced from No. 5.323. |
| 378 | 5.323 (b) | Finished iron produced from No. 5.323 (a). |
| 379 | J.306 | Blooms of wrought iron made by Pariahs from local ores, Namagiripelt, Salem District, Madras. |
| 380 | J.308 | Slag from the furnaces used in making J.306. |
| 381 | J.309 | Cakes of steel produced by decarburizing cast-iron shot formed accidentally during the manufacture of J.306. |

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 382 | I.475 | Crucibles charged with wrought iron, wood and leaves of <i>Calotropis gigantea</i> , ready for the furnace., Trichinopoly District, Madras. |
| 383 | I.476 | Crucibles with " Wootz " (steel) ingots inside, after removal from the furnace, Trichinopoly District, Madras. |

Specimens from the Iron Ore Ranges of Bihar and Orissa.

| | | |
|-----|--------|--|
| 384 | M.417 | Large mass of hæmatite, Pansira Mine. Presented by the Bengal Iron Co., Ltd. |
| 385 | 22,150 | Large mass of hæmatite, Budu Buru Hill, near Manharpur, Bihar and Orissa. Presented by the Bengal Iron Co., Ltd. |
| 386 | M.282 | Hæmatite, Singhbhum District, Bihar and Orissa. |
| 387 | M.286 | Shaly hæmatite, Singhbhum District, Bihar and Orissa. |
| 388 | L.622 | Blue-grey laminated hæmatite, Rangi Buru, Bihar and Orissa. |
| 389 | M.284 | Hæmatite, Singhbhum, Bihar and Orissa. |
| 390 | I.721 | Micaceous iron ore, Chota Nagpur, Bihar and Orissa. |
| 391 | M.283 | Solid hæmatite, Singhbhum, Bihar and Orissa. |
| 392 | 285 | Solid laminated hæmatite, Singhbhum, Bihar and Orissa. |
| 393 | M.287 | Folded hæmatite, Singhbhum, Bihar and Orissa. |
| 394 | 31,602 | Hæmatite iron ore, Singhbhum, Bihar and Orissa. |
| 395 | 31,608 | Banded iron ore, Singhbhum, Bihar and Orissa. |

Manufactured Products made in India from the Iron Ores of Bihar and Orissa.

Presented by the Bengal Iron Co., Ltd., Kulti.

| | | |
|---------|-----------------|---|
| 396 | M.353 | Raw materials used at the Bengal Iron Co.'s works. |
| 397 | M.354 | Samples of various grades of pig iron made by the Bengal Iron Co., Ltd., at Kulti. |
| 398 | M.355 | Electric Light Standard, as supplied for New Delhi, by the Bengal Iron Co., Ltd. |
| 399-409 | M.356- M.372 | Various castings produced by the Bengal Iron Co., Ltd. |
| 410-416 | M.367- M.372 | Axle boxes, chairs, brake blocks and vacuum nozzle, manufactured by the Bengal Iron Co., Ltd. |
| 417-423 | M.373- M.378 | Plate and pot sleepers made by the Bengal Iron Co., Ltd., for the Bombay, Baroda & Central India Railway, the North-Western Railway, and the Madras & Southern Maharatta Railway. |

Iron Ore from the Bababudan Hills, and Charcoal Pig Iron made from them, by the Mysore Wood Distillation and Iron Works. Presented by the Mysore

Geological Department.

| Serial No. | Reg. No. | Description. |
|------------|-----------------|---|
| 424 | M.306 | Hæmatite-quartzite, Kadur District, Mysore. |
| 425 | M.301 | Micaceous hæmatite, Kadur District, Mysore. |
| 426 | M.302 | Grey hæmatite, Kadur District, Mysore. |
| 427 | M.303 | Mottled stoney hæmatite, Shimoga District, Mysore. |
| 428 | M.304 | Limonite, Kadur District, Mysore. |
| 429 | M.305 | Hard limonite, Shimoga District, Mysore. |
| 430 | M.307 | Dolomite used as flux in the manufacture of charcoal iron, Mysore. |
| 431-434 | M.308- M.311 | Various grades of charcoal iron, manufactured at the Mysore States' Iron Works. |

LEAD, SILVER, ZINC.

ALTHOUGH galena, the sulphide of lead, has been found at many places in the Indian Empire, the development of the lead, silver and zinc industries has depended on the exploitation of the great ore deposit of Bawdwin in the Northern Shan States of Burma. The silver from these ores was extracted by the Chinese for centuries. European operations date from 1902, and in 1914 the control of the mine passed into the hands of the Burma Corporation, Ltd. Underground work below the level of the old Chinese excavations has proved the existence of an ore channel, at least 8,000 feet long and 400 to 500 feet wide. Within this zone there are two ore bodies of major importance. The first, known as the "Chinaman," is a huge lenticular replacement, which, although not fully explored, is proved to contain nearly 5,000,000 tons of ore, averaging 27.6 per cent. of lead, 19 per cent. of zinc, 0.5 per cent. of copper, and 25 ozs. of silver per ton of lead. The second, the "Shan" ore body, probably contains over 500,000 tons of ore averaging 17 per cent. of copper and 19.3 ozs. of silver per ton of lead. Ore containing under 20 per cent. of combined lead and zinc is not included in these calculations, though very large quantities of such material exist. Bawdwin now produces about 40,000 tons of metallic lead and 4,500,000 ozs. of silver per annum, smelted locally from its ores. The ore reserves, both proved and probable, make it safe to predict that Burma is likely to be the chief new factor in the world's production of lead.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 435 | L. 70 | High grade ore. Argentiferous galena with zinc blende, Bawdwin Mines, Northern Shan States, Burma. |
| 436 | M.419 | Lead-silver ore, Bawdwin Mines. Presented by the Burma Corporation, Ltd. |
| 437 | L.967 | Argentiferous galena, Bawdwin Mines, Northern Shan States, Burma. |
| 438 | M.418 | Zinc-lead ore, Bawdwin Mines. Presented by the Burma Corporation, Ltd. |
| 439 | K.990 | Argentiferous galena, Yunnan, Western China. |
| 440 | J.686 | Galena, Manbhum, Bihar and Orissa. |
| 441 | K.815 | Galena vein in schist stained with oxidised compounds of copper and iron, Sonthal Perganas, Bihar and Orissa. |
| 442 | I.264 | Galena with cerussite and tremolite, Sonthal Perganas, Bihar and Orissa. |
| 443 | H.325 | Galena with quartz and ochre, Cuddapah District, Madras. |
| 444 | I. 6 | Metallic lead, free from silver, reduced from galena by Chinese, Bawzain, Southern Shan States, Burma. |
| 445 | I.153 | Litharge, obtained in the cupellation of lead reduced from galena by Chinese, Bawzain, Southern Shan States, Burma. |

MANGANESE.

INDIA'S deposits of manganese ores are the most important in the British Empire, and rank with the greatest in the world. The output is now about 600,000 or 700,000 tons per annum, but it has reached over 900,000 tons. The industry dates from 1891, when the deposits of the Vizagapatam District in Madras were opened up. The best ores come from the Balaghat, Chhindwara, Nagpur and Seoni Districts of the Central Provinces, but there are mines in Central India, Bombay, Bihar, Madras and Mysore as well.

The development of the Bessemer and open-hearth processes for making steel created the demand for the manganese alloys, and the steel industry now consumes about 90 per cent. of the world's production of manganese ores in connection with these processes. The ores are also used in the heavy chemical, electrical and glass industries.

The Indian manganese ore deposits of economic value are divided by Dr. Fermor into three main groups:—

- (a) Deposits associated with a series of manganiferous intrusives known as the *kodurite* series.
- (b) Deposits associated with rocks of Dharwar age—the manganiferous facies of which is known, when containing spessartite-garnet, as the *gondite* series.
- (c) Deposits occurring as lateritoid replacement masses on the outcrops of Dharwar rocks.

The *kodurite* series is developed typically in the Vizagapatam District of Madras, where it occurs associated with other Archæan rocks. Some of its ore deposits are of very large size. The ores are composed mainly of psilomelane, with subordinate amounts of pyrolusite, braunite and mangan-magnetite and vredenburgite.

The *gondite* series is composed of metamorphosed manganiferous sediments of Dharwar age, and is characterised by the presence of various manganiferous silicates, the most important of which are the manganese-garnet, spessartite, and the manganese-pyroxene, rhodondite. The series is developed typically in the districts of Balaghat, Bhandara, Chhindwara and Nagpur in the Central Provinces, but has also been found in several other areas. Forming an integral part of these rocks are bodies of manganese ore, often of great size and first-rate quality. Thus the Balaghat deposit is $1\frac{3}{4}$ miles long, and the Manegaon one is $1\frac{1}{2}$ miles long. Another band in the Balaghat District is exposed more or less continuously for nearly 6 miles. The typical ores are mixtures of braunite and psilomelane of different degrees of coarseness and grain.

The *lateritoid* ores are typically developed in the Singhbhum District of Bihar and Orissa, and the Bellary and Sandur Districts of Madras, and in the Chitaldrug, Kadur, Shimoga and Tumkur Districts of Mysore. The conditions under which the ores occur leave little doubt that they have been formed by the replacement at the surface of Dharwar schists, phyllites and quartzites. They are irregular in shape, and in their cavernous and rugged aspect resemble masses of ordinary laterite. They often contain considerable quantities of iron compounds, and grade from manganese ores proper, through ferruginous manganese ores, and manganiferous iron ores, to pure iron ores. The typical minerals are pyrolusite, psilomelane, wad, and, more rarely, pseudo-manganite, with limonite and earthy hæmatite.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 446 | 691 | Vredenburgite, a new Indian mineral composed of oxides of manganese and iron, Vizagapatam District, Madras. |
| 447 | B.322 | Sitaparite, a new Indian mineral, containing oxides of manganese, iron and calcium, Chhindwara District, Central Provinces. |
| 448 | 21,993 | Banded sitaparite and braunite. |
| 449 | 325 | Sitaparite in braunite and hollandite. Hollandite is a new Indian mineral, a manganate of barium, manganese and iron, Chhindwara District, Central Provinces. |
| 450 | 21,927 | Braunite-albite rock with blanfordite. Blandfordite is a new Indian manganese-bearing pyroxene, Nagpur District, Central Provinces. |

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 451 | G.958 | Braunite with rhodonite, Nagpur, Central Provinces. |
| 452 | 21,930 | Braunite and blanfordite with quartz, Nagpur District, Central Provinces. |
| 453 | B.883 | Braunite, Balaghat District, Central Provinces. |
| 454 | B.311 | Braunite, Vizagapatam District, Madras. |
| 455 | K.664 | Coarsely crystallised braunite, Balaghat District, Central Provinces. |
| 456 | 18/611 | Braunite and psilomelane, Nagpur District, Central Provinces. |
| 457 | 18/502 | Crystalline braunite, Vizagapatam District, Madras. |
| 458 | 29,274 | Coarsely crystalline braunite, Nagpur District, Central Provinces. |
| 459 | 18/972 | Braunite and psilomelane, Nagpur District, Central Provinces. |
| 460 | J.312 | Pyrolusite, Vizagapatam District, Madras. |
| 461 | 3,598 | Hollandite with sitaparite, braunite and fermorite (fermorite is a new arsenate and phosphate of lime and strontia), Chhindwara District, Central Provinces. |
| 462 | 3,597 | Hollandite with sitaparite, Chhindwara District, Central Provinces. |
| 463 | 328 | Hollandite-sitaparite rock, Chhindwara District, Central Provinces. |
| 464 | 324 | Hollandite, Chhindwara District, Central Provinces. |
| 465 | 1,040 | Hollandite, Chhindwara District, Central Provinces. |
| 466 | 22,150 | Large mass of hollandite, Balaghat District, Central Provinces. |
| 467 | L.227 | Psilomelane, Singhbhum District, Bihar and Orissa. |
| 468 | 18,986 | Mammilated psilomelane, Nagpur District, Central Provinces. |
| 469 | J.679 | Conglomeratic grit, cemented by psilomelane, Dhar Forest, Central India. |
| 470 | M.1,068 | Psilomelane, Jabalpur District, Central Provinces. |
| 471 | K.198 | Psilomelane, Gangpur State, Bihar and Orissa. Presented by J. Schrager, Esq. |
| 472 | 18,385 | Lead-like psilomelane, Vizagapatam District, Madras. |
| 473 | J.318 | Psilomelane, Vizagapatam District, Madras. Presented by the Vizianagram Mining Co., Ltd. |
| 474 | F.135 | Psilomelane, Jabbalpore District, Central Provinces. |
| 475 | J.319 | Psilomelane with pyrolusite and braunite, Vizagapatam District, Madras. |
| 476 | 21,921 | Blanfordite-braunite-apatite rock, Nagpur District, Central Provinces. |
| 477 | 21,920 | Blanfordite-quartz-felspar rock, Nagpur District, Central Provinces. |
| 478 | 2,276 | Spessartite-rhodonite rock, Chhindwara District, Central Provinces. |
| 479 | 18,299 | Winchite with braunite, quartz and calcite. (Winchite is a new Indian manganese-amphibole). Jhabua State, Central India. |
| 480 | K.943 | Juddite and blanfordite (Juddite is a new Indian manganese amphibole), Nagpur District, Central Provinces. |
| 481 | 3,702 | Juddite, Nagpur District, Central Provinces. |

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 482 | 18,439 | Spandite-rhodonite-pyroxene rock, Vizagapatam District, Madras. Spandite is a manganese-garnet intermediate in composition between spessartite and andradite. |
| 483 | K.944 | Crystals of piedmontite in limestone, Nagpur District, Central Provinces. |
| 484 | J.550 | Fibrous and columnar manganese ore, Kamthi, Central Provinces. |
| 485 | 18,649 | Spotted manganese ore, Nagpur District, Central Provinces. |
| 486 | 18,650 | Do. do. do. |

The following specimens are from the Sooklee, Miragpur and Selwa Mines, and presented by the Central Indian Mining Co., Ltd., Kamptee.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 487 | M.66 | Massive braunite, Sooklee Mines, Kamptee, Central Provinces. |
| 488 | M.67 | Massive pyrolusite, Sooklee Mines, Kamptee, Central Provinces. |
| 489 | M.68 | Slightly crystallised braunite, Sooklee Mines, Kamptee, Central Provinces. |
| 490 | M.69 | Soft variety of manganese-dioxide, Sooklee Mine, Kamptee, Central Provinces. |
| 491 | M.70 | Braunite with spessartite, Sooklee Mine, Kamptee, Central Provinces. |
| 492 | M.71 | Braunite associated with quartz, Sooklee Mine, Kamptee, Central Provinces. |
| 493 | M.72 | Slightly crystalline braunite, Sooklee Mine, Kamptee, Central Provinces. |
| 494 | M.73 | Braunite with iridesence, Sooklee Mine, Kamptee, Central Provinces. |
| 495 | M.74 | Braunite, good example of vugs or cavities in ore, Sooklee Mine, Kamptee, Central Provinces. |
| 496 | M.75 | Excellent quality of crystalline braunite, Sooklee Mine, Kamptee, Central Provinces. |
| 497 | M.76 | Fine compact ore approaching psilomelane, Sooklee Mine, Kamptee, Central Provinces. |
| 498 | M.77 | Foot-wall rock adjoining of ore body, Sooklee Mine, Kamptee, Central Provinces. |
| 499 | M.78 | Schist, hanging wall rock of ore body, Sooklee Mine, Kamptee, Central Provinces. |
| 500 | M.79 | Felspar with biotite from pegmatite intrusion in ore beds, Sooklee Mine, Kamptee, Central Provinces. |
| 501 | M.80 | Large boulder ore denuded from beds, Sooklee Mine, Kamptee, Central Provinces. |
| 502 | M.81 | Small manganese boulder ore denuded from ore bed, Sooklee Mine, Kamptee, Central Provinces. |
| 503 | M.82 | Braunite associated with the foot wall rock, Sooklee Mine, Kamptee, Central Provinces. |
| 504 | M.83 | Fine crystalline braunite, Sooklee Mine, Kamptee, Central Provinces. |
| 505 | M.84 | Very hard and brittle braunite, Sooklee Mine, Kamptee, Central Provinces. |
| 506 | M.85 | Quartzite, hanging wall rock of ore body, Sooklee Mine, Kamptee, Central Provinces. |

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 507 | M.86 | Massive peroxide ore, Sooklee Mine, Kamptee, Central Provinces. |
| 508 | M.87 | Braunite, Miragpur Mine, Kamptee, Central Provinces. |
| 509 | M.88 | Massive braunite, Miragpur Mine, Kamptee, Central Provinces. |
| 510 | M.89 | Hanging wall rock of ore body, Miragpur Mine, Kamptee, Central Provinces. |
| 511 | M.90 | Ore, crystalline variety, Selwa Mine, Kamptee, Central Provinces. |
| 512 | M.91 | Felspars from pegmatite intrusive into ore bed, Selwa Mine, Kamptee, Central Provinces. |

MOLYBDENUM.

MOLYBDENITE is the chief source of metallic molybdenum, and the alloy ferro-molybdenum. These are used in the manufacture of alloy steels, to which they impart many desirable qualities, especially when used in conjunction with other metals, such as chromium, nickel, tungsten and vanadium.

Molybdenite is a fairly common member of the group of minerals found in association with the wolfram and cassiterite-bearing quartz veins of Lower Burma. Small parcels have been exported from the Tavoy District, but, owing to primitive methods of mining and concentration, the industry has not advanced beyond an early experimental stage yet.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 513 | L.449 | Molybdenite in quartz, Ansinpaya Mine, Tavoy District, Burma. |
| 514 | 3,960 | Molybdenite from a pegmatite, Vizagapatam District, Madras. |

TIN.

CASSITERITE or tin-stone, the oxide of tin, nearly always accompanies wolfram in Burma; the two minerals are found together in veins and detrital deposits. Tin ore has been mined in the Lower Tenasserim region of Burma from a remote antiquity, and it occurs there in the same rocks and in the same manner as it does in the well-known tin fields of Western Siam and the Malay Peninsula, further to the south.

The more important occurrences are in the Bawlake State of Karenni, and in the Tavoy and Mergui districts. In the latter district especially, ancient alluvial workings are widely distributed, but mining methods to-day are primitive and output low. At two localities in the Tavoy District, however, which lies to the north of Mergui, modern dredging plant is in operation. The insistence by the officers of the Geological Survey of India, that other river gravels of the districts contain tin-stone, has led to several concessions being taken up and systematically bored. The wolfram which is contained in the ores from veins and detrital deposits is removed by magnetic separation. The cassiterite from the true alluvial deposits contains practically no wolfram. Most of the cassiterite concentrates are exported to the Federated Malay States for smelting, though a certain amount of metallic tin is produced by Chinese smelters in Mergui. In 1922 the production amounted to 1,875 tons of tin concentrates and 218 tons of block tin.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 515 | L.963 | Cassiterite crystals, Kanbauk, Tavoy District, Burma. Presented by the Kanbauk (Burma) Wolfram Mines, Ltd. |
| 516 | L.964 | Cassiterite, Hermyingyi, Tavoy District, Burma. Presented by Burma Finance and Mining, Ltd. |
| 517 | L.965 | Pebbles of cassiterite from detrital gravels, Hermyingyi, Tavoy District, Burma. |
| 518 | L.479 | Cassiterite, Tavoy District, Burma. |
| 519 | L.3,307 | Cassiterite, Mergui District, Burma. |
| 520 | I.901 | Stanniferous gravel, Mergui District, Tenasserim, Burma. |
| 521 | H.796 | Ingots of metallic tin smelted by Chinese, Maliwan, Mergui District, Burma. |
| 522 | H.394 | Ingot of tin, cast in the hollow of a split bamboo, Karen Hills, Toungoo, Burma. |
| 523 | — | Ingot of tin, smelted from cassiterite, Hazaribagh District, Bihar and Orissa. Presented by J. Sundermull & Co., Giridih. |

TITANIUM.

ILMENITE, the titaniferous iron ore, is a common accessory mineral in the crystalline rocks of India and Burma, but the largest deposits are those of the beach sands of Travancore, in which it is associated with monazite and zircon, and is obtained as a by-product during the operations for separating the former.

The mineral is now used on a large scale for the manufacture of "titanium white," a permanent pigment which is said to possess all the good qualities and none of the objectionable features of the white lead and zinc pigments.

In the Travancore deposits India possesses very large reserves of this mineral.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 524 | M.28 | Ilmenite sand, Travancore coast. Presented by Messrs. Hopkins & Williams, Ltd., Colachel, Travancore. |

TUNGSTEN.

WOLFRAM, a tungstate of iron and manganese, is the chief ore of tungsten. This metal is an essential constituent of the high-speed steels which, in the last two decades, have revolutionised the machine-shop practice of the world. It has numerous other uses, especially for the preparation of the metallic filaments of incandescent electric lamps.

The wolfram deposits of Lower Burma are the largest in the British Empire. In that province wolfram has been found at intervals over a distance of 750 miles, from the Kyaukse District in the north to the Mergui District in the extreme south. It is always intimately associated with the granite which forms the core of the great system of mountains stretching down from Burma, through Lower Siam and Malay States, to the Dutch East Indies. The Tavoy District is by far the most important producer, and in it the wolfram occurs associated with tin-stone and various other minerals, in quartz veins which pierce the granite and the surrounding rocks. It is also found in profitable quantities in the soil and detrital deposits of the hill sides from which it is obtained by hydraulic methods.

Between 1914 and 1918, 17,642 tons of wolfram concentrates, valued at over £2,320,000, were despatched from Burma to be used eventually in the munitions works of the Allies.

| Serial No. | Reg. No. | Description. |
|---------------|-------------|---|
| 525 | L.407 | Wolfram with quartz, Tavoy District, Burma. |
| 526 | 427 | Wolfram in pegmatite, Tavoy District, Burma. |
| 527 | 818 | Wolfram in mica-schist, Jodhpur, Rajputana. |
| 528 | L.468 | Wolfram, Amherst District, Burma. |
| 529 | 407 | Wolfram with cassiterite, Tavoy District, Burma. |
| 530 | K.688 | Wolfram, Southern Shan States, Burma. |
| 531 | L.966 | Wolfram, Hermyingyi Mine, Tavoy District, Burma. Presented by Burma Finance and Mining, Ltd. |

ZIRCONIUM.

ZIRCON is the ortho-silicate of zirconium, which, when large enough and sufficiently free from flaws, forms the gem known as the "hyacinth." The mineral is a common accessory constituent of many gneisses and granites, and the sands derived from such rocks often contain small grains of it.

Large quantities are obtained as a by-product during the extraction of monazite from the beach sands of Travancore, and small parcels have been shipped to Europe and America for experimental purposes. It is used in the manufacture of ferro-zirconium, and as a refractory lining for metallurgical and glass furnaces.

| Serial No. | Reg. No. | Description. |
|---------------|-------------|--|
| 532 | M.29 | Zircon sand, Travancore Coast. Presented by Messrs. Hopkins & Williams, Ltd., Colachel, Travancore. |

CLASS II.—MINERALS.

GROUP II.—OTHER MINERALS OF ECONOMIC IMPORTANCE.

| | | | | | | |
|----------------------------|----|----|----|----|----|----|
| Abrasives | .. | .. | .. | .. | .. | .. |
| Asbestos | .. | .. | .. | .. | .. | .. |
| Barytes | .. | .. | .. | .. | .. | .. |
| Borax | .. | .. | .. | .. | .. | .. |
| Calcium Salts | .. | .. | .. | .. | .. | .. |
| Coal | .. | .. | .. | .. | .. | .. |
| Graphite | .. | .. | .. | .. | .. | .. |
| Magnesium compounds | .. | .. | .. | .. | .. | .. |
| Mica | .. | .. | .. | .. | .. | .. |
| Monazite | .. | .. | .. | .. | .. | .. |
| Ochres | .. | .. | .. | .. | .. | .. |
| Oil shale | .. | .. | .. | .. | .. | .. |
| Ornamental stones | .. | .. | .. | .. | .. | .. |
| Petroleum and its products | .. | .. | .. | .. | .. | .. |
| Phosphates.. | .. | .. | .. | .. | .. | .. |
| Potassium salts | .. | .. | .. | .. | .. | .. |
| Rare earth minerals | .. | .. | .. | .. | .. | .. |
| Refractories | .. | .. | .. | .. | .. | .. |
| Salt | .. | .. | .. | .. | .. | .. |
| Slate | .. | .. | .. | .. | .. | .. |
| Steatite | .. | .. | .. | .. | .. | .. |
| Strontium salts | .. | .. | .. | .. | .. | .. |
| Sulphur | .. | .. | .. | .. | .. | .. |

ABRASIVE MINERALS.

THE abrasive minerals which have been worked in India are corundum, sillimanite and garnet. Corundum is the natural oxide of aluminium. It occurs as a massive rock at Pipra, in Rewah State, Central India. It is very widely distributed in Madras and Mysore, generally in a crystalline form, both in basic rocks and pegmatites. A great number of localities are known in the Anantapur, Coimbatore, South Kanara and Salem Districts of Madras, where the mineral is obtained as loose grains and crystals from the surface soil, into which it finds its way from the weathering of the underlying rocks.

Sillimanite, a silicate of aluminium, occurs with corundum in the form of a grey, fibrous rock, at certain localities in the Khasi and Jaintia Hills of Assam. It may prove to possess greater value as a refractory than as an abrasive mineral, but, during the war, large quantities were shipped, probably as corundum, especially to the United States of America, where it was used in fine optical grinding.

The common Indian garnet, andradite, is a silicate of calcium and iron. It is a very prevalent mineral in the gneisses and schists of the Indian Peninsula. (The gem varieties of garnet, almandite, which have a deep crimson colour, come mainly from the Jaipur and other States of Rajputana.) Common garnet is used for making garnet paper, cloth and discs, which are absorbed mainly by the wood and leather trades for finishing purposes.

The output of the abrasive minerals in India varies a great deal from year to year.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 533 | J. 41 | Corundum-bearing inclusion in the Charnockite Series, Palakod, Salem District, Madras. |
| 534 | 863 | Corundum crystals in granite, Sapphire Mines, Zanskar Range, Kashmir. |
| 535 | 1,732 | Corundum crystals in kyanite rock, Manbhum District, Bihar and Orissa. |
| 536 | 10,142 | Corundum in a matrix of orthoclase, Salem District, Madras. |
| 537 | J.13 | Corundum from coarse felspar vein, associated with elæolite syenite, Coimbatore District, Madras. |
| 538 | I.858 | Corundum with euphyllite and tourmaline, Pipra, Rewah State, Central India. |
| 539 | 20/10 | Corundum with schorl and euphyllite, Pipra, Rewah State, Central India. |
| 540 | 11,438 | Corundum crystals, Palakod, Salem District, Madras. |
| 541 | L.998 | Corundum in pegmatite, Coimbatore District, Madras. |
| 542 | 9,192 | Corundum, Hunsur, Mysore. |
| 543 | I.860 | Corundum, Gobuguru, Hyderabad. Presented by the Hyderabad Deccan Co. |
| 544 | J.68 | Corundum crystals, Bourmanahalli, Mysore. |
| 545 | M.1,551 | Garnet crystals for hornblende schist, Nellore District, Madras. |
| 546 | M.26 | Garnet sand, Travancore Coast. Presented by Messrs. Hopkins & Williams, Colachel. |

ASBESTOS.

ALTHOUGH chrysotile asbestos is known to occur in association with certain ultra-basic rocks of Peninsular India (see "Peridotites" in the Rock Section of this collection), the varieties which have been worked on a small scale belong to the group of minerals known as Amphibole-Asbestos. The tremolite and actinolite species of this group often possess exceedingly long fibres, but they are weaker and more brittle than those of chrysotile-asbestos, and not suitable for spinning, though they have good insulating and acid-resisting properties.

Amongst other localities the following may be mentioned—Seraikela, Bihar and Orissa; Dev Mori, Idar State, Bombay; Nanjangud, Mysore.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 547 | L.997 | Asbestos, Seraikela State, Bihar and Orissa. Presented by the Feudatory Chief of Seraikela. |
| 548 | L.996 | Washed and dressed asbestos prepared from L.997. Presented by the Feudatory Chief of Seraikela. |
| 549 | K.822 | Washed and dressed asbestos, Dev Mori, Idar State, Bombay. |

BARYTES.

BARYTES, the sulphate of barium, occurs at many localities in India, but the purest varieties come from Betamcherla, in the Kurnul District, and Alangayam in the Salem District of Madras; also from Bhankhera and other places in Alwar State, Rajputana.

The mineral finds its chief use in the paint industry, and the greater part of the world's output is probably consumed in the manufacture of lithophane.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 550 | L.373 | Barytes, Kurnul District, Madras. Presented by M. R. Ry., Sessa Reddy. |
| 551 | 3,386 | Barytes, with galena, Ranchi District, Bihar and Orissa. |
| 552 | 21/64 | Barytes with tetrahedrite, chalcophyrite, malachite and azurite, Sleemanabad, Jubbulpore District, Central Provinces. |
| 553 | M.393 | Massive barytes, Balpalpalli, Kurnul District, Madras. Presented by the Indian Minerals Co. |
| 554 | M.395 | Lump barytes, Balpalpalli, Kurnul District, Madras. Presented by the Indian Minerals Co. |
| 555 | M.394 | Picked lump barytes, prepared for crushing, Balpalpalli, Kurnul District, Madras. Presented by the Indian Minerals Co. |
| 556 | M.396 | Ground barytes. Presented by the Indian Minerals Co., Betamcherla. |

BORAX.

THE region from which Indian borax is derived commences at the Puga Valley, in the Ladak region of Kashmir, and passes last through Rudok into Tibet. Along this tract of country there is a chain of salt lakes in various stages of desiccation which yield borax. The crude borax of Tibet is carried over the high passes of the Himalayas on the backs of sheep and goats, and brought into the plains of the United Provinces to be refined at Ramnagar and elsewhere.

Before the discovery of the natural borates in America and elsewhere India exported large quantities of borax to Europe, but after 1887 this trade was lost. There is still a steady export trade to the Straits Settlements and China.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 557 | L.962 | Tibetan borax. Refined from crude "Tincal" at Ramnagar, United Provinces. Presented by B. Sheopratap, Calcutta. |

CALCIUM SALTS.

BEDS of impure gypsum occupy the basins of desiccated salt lakes among the sand hills of Marwar and Bikanir in Rajputana. The mineral exists in enormous quantities in association with the salt marl along the southern base of the Salt Range in the Jhelum, Shahpur and Mianwali Districts of the Punjab. There are large amounts available, also, in the North-West Frontier Province, in Kachh, and in Sind.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 558 | 3,297 | Gypsum, Magwe District, Burma. |
| 559 | J.214 | Rhombohedral calcite, Godwar, Rajputana. |
| 560 | 1,277 | Selenite. Presented by the Asiatic Society of Bengal. |
| 561 | 3,333 | Gypsum, Rampur, Idar State, Bombay. |
| 562 | 1,324 | Fibrous gypsum, Guman Pass, Afghanistan. |
| 563 | J.279 | Selenite, Rann of Kachh, Bombay. |

COAL.

WITH the exception of the United Kingdom, India produces more coal than any other Dominion of the British Empire. An output of about 1,000,000 tons was reached in 1880, and, after that, increased continuously until 1919, when the record production of over 22,500,000 tons was raised. Since then there has been a slight decrease, and the output in 1922 was 19,010,986 tons.

Over 90 per cent. of India's coal production is consumed within her own borders by the railways, jute and cotton mills, and industrial concerns of every description. The internal demand, indeed, is great enough to lead to the importation of foreign coal in large quantities, though in pre-war years India used to export coal to Ceylon, the Straits Settlements, Aden, Java and Sumatra.

The growth of the Indian coal mining industry may be gauged by the fact that in 1912-13 there were joint stock coal companies with a total paid-up capital of Rs. 716 lakhs, whereas in 1921-22, the corresponding figures were 276 companies and Rs. 1,013 lakhs. This is without taking into consideration the funds employed by private syndicates and individuals.

About 97 per cent. of the coal comes from the Lower Gondwana rocks of the Peninsula. The remainder is mined from Tertiary rocks of Assam, the Punjab, Baluchistan, etc.

The producing coalfields of Bengal and Bihar and Orissa belong chiefly to the Damuda Valley group. They are isolated patches of Gondwana strata, faulted down into the ancient crystalline rocks. The easternmost of the group, the Raniganj field, is about 130 miles north-east of Calcutta. It has an area of 500 square miles, large reserves of first-class coal, and some thousands of millions of tons of second-class material. It produces about 27 per cent. of India's total.

Sixteen miles further west is Jherria, with an area of 150 square miles. It has large reserves of first quality coal and vast stores of more inferior material. It accounts at present for over 50 per cent. of the total.

Continuing further west is the Bokaro field, opened up by railway connection in 1919, and under rapid development at present. Ramgarh, with an area of 40 square miles, and Karanpura (north and south), extending over 472 square miles. They are remarkable for seams of great thickness. Thus, the Kargali seam of Bokaro varies from 75 to 120 feet thick. Further west still there are other undeveloped fields stretching at intervals into the Central Provinces and Central India, where some of them are being exploited, as at Mohpani and the Pench Valley, at Umaria and elsewhere. In Hyderabad there is the producing field of Singarenni.

Most of the Tertiary coal comes from the fields of Makum and Nazira, where, again, very large reserves exist.

GONDWANA COALS.

Raniganj Coalfield.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 564 | M. 22 | Coal, Sodepore Colliery, Raniganj Coalfield. Presented by the Bengal Coal Co., Ltd. |
| 565 | M. 23 | Coal, Sanctoria Seam, Seetulpore Colliery, Raniganj Coalfield. Presented by the Bengal Coal Co., Ltd. |
| 566 | M. 92 | Coal, Seebpore, Raniganj Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 567 | M. 93 | Coal, Koithi Seam, Raniganj Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 568 | M. 94 | Coal, Koithi Seam, Raniganj Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 569 | M. 95 | Coal, Poniaty Seam, Raniganj Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 570 | M. 96 | Coal, Ghusik Seam, Raniganj Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 571 | M. 97 | Coal, Poniaty Seam, Banksimula Colliery, Raniganj Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 572 | M. 98 | Coal, Belrui Seam, Raniganj Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 573 | M. 99 | Coal, Koithi Seam, Banksimula Colliery, Raniganj Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 574 | M.104 | Coal, Koithi Seam, Charanpur Colliery, Raniganj Coalfield. Presented by Messrs. Bird & Co. |
| 575 | M.105 | Coal, Poniaty Seam, Charanpur Colliery, Raniganj Coalfield. Presented by Messrs. Bird & Co. |
| 576 | M.244 | Coal, Lutchipur Colliery, Raniganj Coalfield. Presented by Messrs. Bird & Co. |
| 577 | M.252 | Rubble coal, mechanically screened, Saltore Colliery, Raniganj Coalfield. Presented by Messrs. Bird & Co. |
| 578 | M.253 | Steam coal, mechanically screened, Saltore Colliery, Raniganj Coalfield. Presented by Messrs. Bird & Co. |
| 579 | M.255 | Coal, Samla Seam, Samla-Ramnagar Colliery, Raniganj Coalfield. Presented by Messrs. Martin & Co. |
| 580 | M.256 | Coal, Samla Seam, Samla-Kendra Colliery, Raniganj Coalfield. Presented by Messrs. Martin & Co. |
| 581 | M.257 | Coal, Kasta Seam, No. 2 Incline, Poriapur Colliery, Raniganj Coalfield. Presented by Messrs. Martin & Co. |

| Serial No. | Reg. No. | Description. |
|---------------|-------------|---|
| 582 | M.258 | Coal, Kasta Seam, No. 3 Incline, Poriapur Colliery, Raniganj Coalfield. Presented by Messrs. Martin & Co. |
| 583 | M.259 | Coal Ghusik Seam, Kalipahari Colliery, Raniganj Coalfield. Presented by Messrs. Martin & Co. |
| 584 | M.260 | Coal, Kasta Seam, No. 1 Incline, Korabad-Nadiah Colliery, Raniganj Coalfield. Presented by Messrs. Martin & Co. |
| 585 | M.261 | Coal, Kasta Seam, No. 2 Incline, Korabad-Nadiah Colliery, Raniganj Coalfield. Presented by Messrs. Martin & Co. |
| 586 | M.262 | Coal, Kasta Seam, No. 3 Incline, Korabad-Nadiah Colliery, Raniganj Coalfield. Presented by Messrs. Martin & Co. |
| 587 | M.265 | Coal, Top Seam, New Beerbhoom coal, Victoria Colliery, Raniganj Coalfield. Presented by Messrs. Balmer, Lawrie & Co. |
| 588 | M.266 | Coal, Middle Seam, New Beerbhoom coal, Victoria Colliery, Raniganj Coalfield. Presented by Messrs. Balmer, Lawrie & Co. |
| 589 | M.267 | Coal, Bottom Seam, New Beerbhoom coal, Victoria Colliery, Raniganj Coalfield. Presented by Messrs. Balmer, Lawrie & Co. |
| 590 | M. 268 | Coal, Dishergarh Seam, Joyramdanga Colliery, Raniganj Coalfield. Presented by Messrs. Balmer, Lawrie & Co. |
| 591 | M.269 | Coal, Barboni Seam, Joyramdanga Colliery, Raniganj Coalfield. Presented by Messrs. Balmer, Lawrie & Co. |
| 592 | M.270 | Coal, Dishergarh Seam, Chinchuria Colliery, Raniganj Coalfield. Presented by Messrs. Balmer, Lawrie & Co. |
| 593 | M.271 | Coal, Dishergarh Seam, Damuda Colliery, Raniganj Coalfield. Presented by Messrs. Balmer, Lawrie & Co. |
| 594 | M.272 | Coal, Ragnathbutty Seam, Damuda Colliery, Raniganj Coalfield. Presented by Messrs. Balmer, Lawrie & Co. |

GONDWANA COALS.

Jharia Coalfields.

| | | |
|-----|-------|---|
| 595 | M. 44 | Coal, Koosoonda and Nyadee Collieries, Jharia Coalfield Presented by Messrs. Martin & Co. |
| 596 | M. 45 | Coal, Koosoonda and Nyadee Collieries, Jharia Coalfield. Presented by Messrs. Martin & Co. |
| 597 | M. 46 | Coal, Koosoonda and Nyadee Collieries, Jharia Coalfield. Presented by Messrs. Martin & Co. |
| 598 | M. 47 | Coal, Koosoonda and Nyadee Collieries, Jharia Coalfield. Presented by Messrs. Martin & Co. |
| 599 | M.100 | Coal, Bottom Seam, Bhatdih Colliery, Jharia Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 600 | M.101 | Coal, Seam 12, Bhuggatdih Colliery, Jharia Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 601 | M.102 | Coal, Seam 15, Bhuggatdih Colliery, Jharia Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 602 | M.103 | Coal, Seam 14, Bhuggatdih Colliery, Jharia Coalfield. Presented by Messrs. Andrew Yule & Co. |
| 603 | M.245 | Coal, 10 Seam, Kendwadih Colliery, Jharia Coalfield. Presented by the East India Coal Co. |

| Serial No. | Reg. No. | Description. |
|---------------|-------------|---|
| 604 | M.246 | Coal, 11 Seam, Kendwadih Colliery, Jharia Coalfield. Presented by the East India Coal Co. |
| 605 | M.247 | Coal, 12 Seam, Kendwadih Colliery, Jharia Coalfield. Presented by the East India Coal Co. |
| 606 | M.248 | Coal, 13 Seam, Kendwadih Colliery, Jharia Coalfield. Presented by the East India Coal Co. |
| 607 | M.249 | Coal, 14 Seam, Bararee Colliery, Jharia Coalfield. Presented by the East India Coal Co. |
| 608 | M.250 | Coal, 14A Seam, Bararee Colliery, Jharia Coalfield. Presented by the East India Coal Co. |
| 609 | M.251 | Coal, 15 Seam, Bararee Colliery, Jharia Coalfield. Presented by the East India Coal Co. |
| 610 | M.326 | Coal, Seam 12, Kusunda Colliery, Jharia Coalfield. Presented by Messrs. Anderson, Wright & Co. |
| 611 | M.327 | Coal, 13 Seam, Kusunda Colliery, Jharia Coalfield. Presented by Messrs. Anderson, Wright & Co. |
| 612 | M.328 | Coal, 14 Seam, Kusunda Colliery, Jharia Coalfield. Presented by Messrs. Anderson, Wright & Co. |
| 613 | M.330 | Coal, 15 Seam, Kusunda Colliery, Jharia Coalfield. Presented by Messrs. Anderson, Wright & Co. |
| 614 | M.331 | Coal, 16 Seam, Kusunda Colliery, Jharia Coalfield. Presented by Messrs. Anderson, Wright & Co. |
| 615 | M.333 | Coal, 10 Seam, Alkusa North, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 616 | M.334 | Coal, 11 Seam, Alkusa North, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 617 | M.335 | Coal, 10 Seam, Alkusa South, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 618 | M.336 | Coal, 11 Seam, Alkusa South, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 619 | M.337 | Coal, 12 Seam, Alkusa South, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 620 | M.338 | Coal, 13 Seam, Alkusa South, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 621 | M.339 | Coal, 12 Seam, Kustore North, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 622 | M.340 | Coal, 12 Seam, Kustore North, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 623 | M.341 | Coal, 13 Seam, Kustore North, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 624 | M.342 | Coal, 15 Seam, Kustore North, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 625 | M.343 | Coal, 12 Seam, Kustore South, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 626 | M.344 | Coal, 13 Seam, Kustore South, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 627 | M.345 | Coal, 10 Seam, Gondoodih Colliery, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 628 | M.346 | Coal, 16 Seam, Burragarh Colliery, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 629 | M.347 | Coal, 15 Seam, Tata's Malkera Colliery, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |
| 630 | M.348 | Coal, 16 Seam, Tata's Malkera Colliery, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |

| Serial No. | Reg. No. | Description. |
|---------------|-------------|---|
| 631 | M.349 | Coal, 15 Seam, Tata's Sijua Colliery, Jharia Coalfield. Presented by Messrs. Kilburn & Co. |

GONDWANA COALS.

Giridih Coalfield.

Description.

| | | |
|-----|-------|--|
| 632 | M.379 | Coal, No. 1 Central Pit, Top Seam, E.I. Ry. Colliery, Giridih Coalfield. Presented by the East Indian Railway Co. |
| 633 | M.380 | Coal, Top Seam, 16A Pit, E.I. Ry. Colliery, Giridih Coalfield. Presented by the East Indian Railway Co. |
| 634 | M.381 | Coal, Middle Seam, No. 1 Central Pit, E.I. Ry. Colliery, Giridih Coalfield. Presented by the East Indian Railway Co. |
| 635 | M.382 | Coal, Bottom Seam, No. 1 Central Pit, E.I. Ry. Colliery, Giridih Coalfield. Presented by the East Indian Railway Co. |
| 636 | M.383 | Coal, Jubilee Colliery, Giridih Coalfield. Presented by the East Indian Railway Co. |
| 637 | M.384 | Coal Pit No. 2, Ramnadih Colliery, Giridih Coalfield. Presented by the East India Railway Co. |

Singareni Coalfield (Deccan).

Description.

| | | |
|-----|-------|--|
| 638 | M.107 | Coal, Singareni Coalfield, Deccan. Presented by the Singareni Collieries Co., Ltd. |
|-----|-------|--|

Central Provinces.

Description.

| | | |
|-----|-------|--|
| 639 | M. 14 | Coal, Chandametta, Pench Valley Coalfield, Central Provinces. Presented by Messrs. Shaw, Wallace & Co. |
| 640 | M. 15 | Coal, Chandametta, Pench Valley Coalfield, Central Provinces. Presented by Messrs. Shaw, Wallace & Co. |
| 641 | M. 16 | Coal, Chandametta, Pench Valley Coalfield, Central Provinces. Presented by Messrs. Shaw, Wallace & Co. |

Central India.

Description.

| | | |
|-----|-------|---|
| 642 | M.254 | Coal, Burhar State Collieries, Umaria Coalfield. Presented by H. H. The Maharaja of Rewa. |
|-----|-------|---|

Assam Coalfields.

Description.

| | | |
|-----|-------|---|
| 643 | M.106 | Coal, Thick Seam, Top Section, Margherita, Upper Assam. Presented by the Assam Railways & Trading Co. |
| 644 | M.277 | Coal, Margherita, Upper Assam. Presented by G. E. Hines, Esq., Colliery Superintendent, Margherita. |

Miscellaneous Coal Products.

Description.

| | | |
|-----|-------|---|
| 645 | M.229 | Hard coke from Loyabad By-Product Plant. Presented by the Barakar Coal Co. |
| 646 | M.280 | Coal tar, from Loyabad By-Product Plant. Presented by the Barakar Coal Co. |
| 647 | M.281 | Sulphate of ammonia, from Loyabad By-Product Plant. Presented by the Barakar Coal Co. |

GRAPHITE.

SOME years ago, about 13,000 tons of graphite were obtained annually from Travancore, where the mineral is found under much the same conditions as it is in Ceylon, but the mines were closed down in 1912.

More recently small quantities have been obtained from the Kalahandi and Patna States of Orissa, where the prevailing rocks are *Khondalites*, which contain graphite as an essential constituent.

A few tons are also obtained frequently from localities in Ajmere-Merwara, Rajputana.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 648 | F.176 | Graphite, Neduvangand District, Travancore. |
| 649 | 14,286 | Quartz-felspar rock with graphite inclusion, Anuradhapura, Ceylon. |
| 650 | M. 27 | Graphite, Travancore. Presented by Hopkins & Williams, Ltd. |

MAGNESIUM COMPOUNDS.

MAGNESITE is the carbonate of magnesium. It is burnt in kilns to form "caustic" and "sintered" magnesia. The first is the chief component of the "Sorel" cements of the patent flooring and similar trades. The latter is used in the manufacture of refractory bricks for lining steel furnaces.

The largest Indian deposits are those of the Chalk Hills near Salem, in Madras, where the mineral occurs over an area of $4\frac{1}{2}$ square miles in an intricate network of veins traversing ultra-basic rocks. The reserves of magnesite in these hills are practically unlimited. Other important deposits occur in the Mysore and Hassan districts of the Mysore State and elsewhere.

Most of the Indian magnesite is exported, and production varies from year to year. In 1922 it was 19,273 tons. With the growth of the Indian iron and steel industry it is anticipated that there will arise an increasing demand for the mineral in India itself.

Magnesium chloride and magnesium sulphate (Epsom salts) are manufactured on a large scale from the brines obtained from wells at Kharagoda, on the Rann of Kachh, in Bombay.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 651 | 853 | Magnesite, "Chalk Hills," Salem District, Madras. |
| 652 | M. 52 | Magnesite (crude, lump), Salem District, Madras. Presented by the Magnesite Syndicate, Ltd., Suramangalam. |
| 653 | M. 50 | Magnesite (lightly calcined lump), Salem District, Madras. Presented by the Magnesite Syndicate, Ltd., Suramangalam. |
| 654 | M. 51 | Magnesite (lightly calcined ground), Salem District, Madras. Presented by the Magnesite Syndicate, Ltd., Suramangalam. |
| 655 | M. 49 | Magnesite (sintered), Salem District, Madras. Presented by the Magnesite Syndicate, Ltd., Suramangalam. |
| 656 | M.386 | Magnesium chloride, Kharagoda, Bombay. Presented by the Pioneer Magnesia Works, |

MICA.

THE mica deposits of India are the most important in the world, and at the present time produce about 70 per cent. of the world's total.

The great mica belt of Bihar is a strip of country some 12 miles long and 60 to 70 miles wide, composed of schists, gneisses and intruded pegmatites, which runs obliquely across the Monghyr, Hazaribagh and Gaya Districts.

There is another important mica-producing area in the Nellore District of Madras, where the gneisses and schists are traversed by numerous sheets and lenses of coarse, mica-bearing pegmatite.

With the exception of a small quantity of the amber mica known as phlogopite, won in Travancore, the mica mined in India belongs to the variety known as muscovite.

The mineral finds its chief use in the electrical industry as an insulating medium. For this and other purposes, its perfect cleavage, flexibility, toughness, lack of colour in thin sheets, non-conductivity of electricity and heat, and resistance to high temperatures and decomposition make it practically indispensable. The enormous expansion of the electrical trades has depended on the unique combination of properties possessed by mica, and they also enabled the mineral to play a most important part in the war, for the developments of wireless telegraphy, of aeronautical engineering, and of motor transport would have been impossible without it.

In addition to specimens illustrating the occurrence of mica in the field, a collection of the various trade grades and sizes from the Nellore District of Madras is exhibited.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 657 | 9/776 | Contact of mica-schist with coarse muscovite-bearing pegmatite, Pannamore Hill, Nawadih, Bihar and Orissa. |
| 658 | J.295 | " Books " of muscovite, Hazaribagh District, Bihar and Orissa. |
| 659 | J.292 | Muscovite, Bende, Kodarma, Hazaribagh District, Bihar and Orissa. Presented by the Indian Mica Co., Ltd. |
| 660 | J.499 | Muscovite from granite, Hazaribagh District, Bihar and Orissa. |
| 661 | J.251 | Muscovite with ferruginous inclusions, Kodarma, Hazaribagh District, Bihar and Orissa. |
| 662 | I.392 | Muscovite, Hazaribagh District, Bihar and Orissa. |
| 663 | M. 24 | Dark phlogopite, Travancore. |
| 664 | M. 25 | Light-coloured phlogopite, Travancore. Presented by Hopkin & Williams, Ltd., Colachel. |
| 665 | L.592 | Hexagonal crystal of phlogopite, Ponabur Mine, Travancore. Presented by F. Gaston, Esq. |
| 666 | M.391 | Muscovite (best " Calcutta Ruby "), Hazaribagh District, Bihar and Orissa. |
| 667 | M.392 | Biotite, Hazaribagh District, Bihar and Orissa. |

Trade Samples from the Nellore District.

| Serial No. | Reg. No. | Description. |
|------------|--|---|
| 668-700 | <div> <div>M.110-2</div> <div>M.122-4</div> <div>M.126</div> <div>M.131</div> <div>M.135-6</div> <div>M.138-</div> <div>M.160</div> </div> | Thirty-two specimens of various sizes of cut mica. Varalakshmi Mine, Nellore District, Madras. Presented by M.R. Ry., Venkatappa Naidu of Cuddapah. |
| 700-711 | <div> <div>M.161-</div> <div>M.172</div> </div> | Twelve specimens of various sizes of cut mica, Tellabodu Mine, Nellore District, Madras. Presented by the Krishna Mining Co. |
| 712-721 | <div> <div>M.173-</div> <div>M.182</div> </div> | Ten specimens of various sizes of cut mica, Palamani Mine, Nellore District, Madras. Presented by the Tellabodu Co. |
| 722-729 | <div> <div>M.185</div> <div>M.188</div> <div>M.190-1</div> <div>M.194</div> <div>M.198-9</div> <div>M.203</div> </div> | Eight specimens of various sizes of cut mica, Victor Mine, Nellore District, Madras. Presented by M.R. Ry., Vellattur Venkaiah Naidu. |
| 730-733 | <div> <div>M.204</div> <div>M.207</div> </div> | Four specimens of larger sizes of cut mica, Kubera Mine, Nellore District, Madras. Presented by M.R. Ry., Vissa, Lakshminarasayya Pantalu. |
| 734 | M.208 | Spotted mica, Subramania Mine, Nellore District, Madras. Presented by M.R. Ry., Subbaraghava Iyer. |
| 735 | M.209 | Stained mica, Subramania Mine, Nellore District, Madras. Presented by M.R. Ry., Subbaraghava Iyer. |
| 736 | M.210 | Lightly spotted mica, Ramagopal Mine, Nellore District, Madras. Presented by M.R. Ry., Subbaraghava Iyer. |
| 737 | M.211 | Clear mica, Ramagopal Mine, Nellore District, Madras. Presented by M.R. Ry., Subbaraghava Iyer. |
| 738-742 | <div> <div>M.212-</div> <div>M.216</div> </div> | Five specimens of cut mica of various sizes, D Mine, Nellore District, Madras. Presented by the Tellabodu Co. |
| 743 | M.217 | Mica "rounds," D Mine, Nellore District, Madras. Presented by the Tellabodu Co. |
| 744-747 | <div> <div>M.218-</div> <div>M.221</div> </div> | Four specimens of cut mica of various sizes from the Rustum Mine, Nellore District, Madras. Presented by M.R. Ry., K.C. Narasinha Chariar. |
| 748-750 | <div> <div>M.222-</div> <div>M.224</div> </div> | Three specimens of cut mica, fourth grade size, Andinarayana Mine, Nellore District, Madras. Presented by M.R. Ry., Sundararama Pillay. |
| 751 | M.225 | Mica, fourth size grade, L.V. Mine, Nellore District, Madras. Presented by M.R. Ry., Kandamur Venkatasubbaya. |
| 752 | M.226 | Clear mica, second size grade, Venkatachalapatri Mine, Nellore District, Madras. Presented by M.R. Ry., Yallisiri Subba Reddy. |
| 753 | M.227 | Mica, slightly spotted, Venkatachalapatri Mine, Nellore District, Madras. Presented by M.R. Ry., Yallisiri Subba Reddy. |

| Serial No. | Reg. No. | Description. |
|------------|--------------------------|---|
| 754-760 | M.228- M.233 M.236 | Seven specimens of various sizes of cut mica from the Seetharama and Subbarayuda Mines. Nellore District, Madras. Presented by the Sankara Mining Syndicate. |
| 761-762 | M.234- M.235 | |
| | | |
| 763-776 | M.236 M.237 M.238 | Fourteen specimens of cut mica, including "extras," "extra specials," "scissor-cut rounds" and "jam splittings" (used in the manufacture of micanite) Kalichedu Mine, Nellore District, Madras. Presented by the Kalichedu Mining Co. |
| | | |
| | | |
| 777-820 | M.239 M.240 M.241 | Forty-five specimens of cut mica ranging from size grade one to grade five, from the Kandali Mine, Nellore District, Madras. Presented by M.R. Ry., Pitchiah, and M.R. Ry., G. Lakshinarayudu. |
| | | |
| | | |

MONAZITE.

MONAZITE is nominally a phosphate of cerium, but it also contains other rare-earth metals replacing the cerium, and its economic value at present depends on the small amount of thorium which it contains. The percentage of thorium in commercial monazite parcels varies from 5 to 10 per cent. The mineral is used in the preparation of thorium nitrate, which is itself consumed in the manufacture of incandescent gas mantles.

Along the sea coast of Travancore in Southern India there are five major deposits of monazite sands lying between Cape Comorin and Quilon. In these the monazite occurs with quartz, magnetite, garnet, ilmenite and zircon, and it is obtained from them by methods involving water concentration and magnetic separation.

In these sands India possesses by far the largest reserves of monazite known in the world, while, as regards quality, the Indian sand is much superior to that from the other sources of supply in the United States of America and Brazil.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 821 | M. 30 | Monazite sand, Travancore. Presented by Messrs. Hopkins & Williams, Colachel, Travancore. |
| 822 | L.666 | Monazite crystals from a mica bearing pegmatite. |
| 823 | L.668 | Monazite intergrown with columbite, Gaya District, Bihar and Orissa. |

OCHRES.

THE natural mineral colours include the ochres and oxides, and the abundant occurrences of earthy iron ores and of laterites in India lead to their presence in very numerous localities. They are used by villagers for the decoration of walls of huts, houses and temples.

The yellow, brown and red ochres are impure mixtures of ferric hydroxides with sand, clay and other substances. They are exceedingly permanent colours, varying in shade from a brilliant lemon yellow to a rich golden yellow. The red earths owe their colour to ferric oxide, and they, too, are durable pigments of great value to the paint industry. Both varieties are mined on a large scale in the Central Provinces and Central India, and after levigation, are used in the manufacture of oil colours. There are many deposits in Madras, Mysore, Bihar and Orissa, Bombay, Burma and Kashmir.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 824 | M.322 | Crude yellow ochre, used for the manufacture of paint, Katni District, Central Provinces. Presented by Messrs. Turner, Morrison & Co., Calcutta. |
| 825 | M.323 | Levigated ochre made from the crude ochre, Katni District, Central Provinces. Presented by Messrs. Turner, Morrison & Co., Calcutta. |
| 826 | M.324 | Golden-yellow paint made from the levigated ochre. Presented by Messrs. Turner, Morrison & Co., Calcutta. |
| 827 | L.949 | Yellow ochre, Dehra Dun, United Provinces. |
| 828 | L.950 | Red ochre, Dehra Dun, United Provinces. |
| 829 | H. 99 | Red ochreous hæmatite, Jauli Mines, Jabalpur District, Central Provinces. |
| 830 | M.397 | Red oxide of iron, Haragandona Mine, Bellary District, Madras. Presented by the Indian Minerals Co., Betamcherla. |
| 831 | M.398 | Red ochre, Kadatni, Bellary District, Madras. Presented by the Indian Minerals Co., Betamcherla. |
| 832 | M.399 | Yellow ochre, Muddavaram, Kurnool District, Madras. Presented by the Indian Minerals Co., Betamcherla. |

OIL SHALES.

OIL shales were discovered recently in the eastern portion of the Amherst District of Burma, near the Siamese frontier, where they occur in at least three basins of late Tertiary age. The specimen exhibited is from the Tichara basin, which lies some 60 miles east-north-east of Moulmein, and in which the oil shales are said to occur in a series of seams. At least eight of these have been proved, varying in thickness from 4 to 16 ft.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 833 | M.9 | Oil shale, Tichara Basin, Eastern Amherst, Tenasserim, Burma. |

ORNAMENTAL STONES.

THE sandstones of the Vindhyan system of rocks contain unlimited supplies of building stones of incomparable quality, and they have yielded the materials for the masterpieces of Indian architecture from the time of Asoka to the present day.

The foraminiferal limestone of Porbandar deservedly enjoys a high reputation, and is used on a large scale in Bombay and Karachi.

The crystalline marbles of the Archæan formations of India and Burma constitute ornamental stones of unrivalled beauty. The white, pink and yellow marbles of the Rajputana States, such as Jodhpur, Kishangarh and Ajmere may be specially mentioned. The Victoria Memorial in Calcutta is built entirely of marble from the Mekrana quarries of Jodhpur. Serpentine marbles are obtained in the Chhindwara District of the Central Provinces.

Some of the limestones of the Lower Vindhyan series also show exquisite effects on polishing, and have been used together with the shelly limestones of Jaisalmer in the inlaid decoration of the Taj Mahal and other historic buildings.

The crystalline gneisses and similar rocks of South India furnish ornamental stones equal in quality to any imported material.

The Deccan Trap supplies jasper in all its varieties, carnelians, bloodstones, chalcedony, agate and onyx.

The glistening green aventurine of the Bellary District of Madras and the Hassan District of Mysore has been used for mosaic work.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 834 | 16,307 | Brown marble, Kachh, Bombay. |
| 835 | 16,599 | Brown marble, Jaisalmer, Rajputana. |
| 836 | H.909 | Brown limestone, Jaisalmer, Rajputana. |
| 837 | H.805 | Ferruginous limestone, Jaisalmer, Rajputana. |
| 838 | I.532 | Brown limestone, Jaisalmer, Rajputana. |
| 839 | G.511 | Ferruginous limestone, Jaisalmer, Rajputana. |
| 840 | M. 4 | Brown shell limestone, Jaisalmer, Rajputana. |
| 841 | 16,600 | Brown, shell limestone, Jaisalmer, Rajputana. |
| 842 | F.520 | Ferruginous shell limestone, Jaisalmer, Rajputana. |
| 843 | M. 2 | Orange marble, Jodhpur, Rajputana. |
| 844 | 16,844 | Pink, crystalline limestone, Narsingpur District, Central Provinces. |
| 845 | 29,419 | Black marble, Kishengarh, Rajputana. |
| 846 | 29,420 | Grey marble, Kishengarh, Rajputana. |
| 847 | M. 5 | Black marble, Kishengarh, Rajputana. |
| 848 | 16/89 | Grey marble, Kishengarh, Rajputana. |
| 849 | 27/124 | Black marble, Alwar State, Rajputana. |
| 850 | 16/306 | Black marble, Kachh, Bombay. |
| 851 | 16/852 | Black marble, Cuddapah District, Madras. |
| 852 | 16/859 | Green marble, Kharwa State, Rajputana. |
| 853 | M. 3 | Green marble, Jodhpur, Rajputana. |
| 854 | M. 8 | Green, serpentinous marble, Motipur, Baroda. |
| 855 | 19,176 | White marble, Jodhpur, Rajputana. |
| 856 | 19,179 | White marble, Jodhpur, Rajputana. |
| 857 | M. 1 | Pink marble, Jodhpur, Rajputana. |
| 858 | 16,848 | Sea-green marble, Jodhpur, Rajputana. |
| 859 | 16,839 | White dolomite, Narsinghpur, Central Provinces. |
| 860 | 16,743 | White marble, Narsinghpur, Central Provinces. |
| 861 | 1,686 | White crystalline marble, Kyaukse District, Burma. |
| 862 | 17/113 | Granite, North Arcot District, Madras. |
| 863 | 1,049 | Calcite-scapolite-felspar rock, Jodhpur, Rajputana. |
| 864 | 7,235 | Ferruginous shell limestone (unpolished), Jaisalmer, Rajputana. |
| 865 | 27,112 | Tremolite-marble, Narnaul District, Patiala State, Punjab. |
| 866 | 16,841 | Grey limestone, Narsingpur District, Central Provinces. |
| 867 | F.507 | Nummulitic limestone, Nurgur, Punjab. |
| 868 | 1,684 | Crystalline limestone, Madura District, Madras. |
| 869 | 16,861 | Pink marble, Kharwa, Ajmere-Merwara, Rajputana. |
| 870 | 1,081 | Pink marble, Ajmere, Rajputana. |
| 871 | 18,293 | Manganiferous, crystalline limestone, Jhabua State, Central India. |
| 872 | 1,690 | Marble, Kishengarh State, Rajputana. |
| 873 | 27,131 | Marble, Alwar State, Rajputana. |
| 874 | F.515 | Limestone, Ajmere, Rajputana. |
| 875 | F.501 | Shell limestone, Nambur Falls, Assam. |
| 876 | F.552 | Shell limestone, Trichinopoly District, Madras. |
| 877 | M. 7 | Marble, Dhar Forest. |
| 878 | 16,858 | Marble, Kharwa State, Rajputana. |

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 879 | 19,176 | Marble, Jodhpur, Rajputana. |
| 880 | M.314 | Mirzapur sandstone cubes. Presented by Messrs. George Henderson & Co., Ltd. |
| 881 | M.315 | |
| 882 | M.316 | |
| 883 | M.317 | |
| 884 | F. 10 | |
| 885 | I.552 | " Verd-antique " (serpentine marble), Ballistan, Kashmir. |
| 886 | G.297 | Böwénite (pseudo-jade), Gandamak, Afghanistan. |
| 887 | G.298 | White gypsum, Khewra, Jhelum District, Punjab. |
| 888 | G.299 | Mottled gypsum, Khewra, Jhelum District, Punjab. |
| 889 | G.300 | Grey gypsum, Khewra, Jhelum District, Punjab. |
| 890 | M.I,234 | Red gypsum, Khewra, Jhelum District, Punjab. |
| 891 | M.I,235 | Red jasper, irregularly banded with hæmatite, Gwalior, Central India. |
| 892 | M.I,236 | Rolled pebble of red jasper, interbanded with hæmatite, with polished surface, Gwalior, Central India. |
| 893 | M.I,240 | Red ribbon jasper, cut and polished, Gwalior, Central India. |
| 894 | I3,833 | Brown and black ribbon jasper, Gwalior, Central India. |
| 895 | I7,103 | Banded calcareous tufa, near Jhuli, Baluchistan. |
| 896 | 7,552 | Serpentinous limestone, Cuddapah District, Madras. |
| 897 | F.457 | Calcite and aragonite, Helununel, Afghanistan. |
| | | Gneiss, Upper Brahmaputra, Assam. |

PETROLEUM.

THE productive oilfields of the Indian Empire lie in Assam and Burma on the east, and in the Punjab on the west. Corresponding with the Arrakan, or Shan, system of folded rocks on the east with its extension into the oil-bearing regions of Java, Sumatra and Borneo, there is a similar system on the west, in the Punjab and Baluchistan, with a continuation beyond the limits of British India, into the rich oilfields of Persia and the possible ones of Mesopotamia.

In Burma there are two separate zones of oil-bearing strata separated by the mountain ridges of the Arakan yoma. The first includes all the occurrences of petroleum on the Arakan coast, is of no great commercial importance as far as is known at present, and is really the southern prolongation of the oil-bearing belt of Assam. The second extends through the valleys of the Irrawaddy and Chindwin Rivers, and includes, amongst others, the well-known fields of Yenangyaung, Singu and Yenangyat. In these the oil is found in a group of Tertiary rocks known as the Pegu system. It consists of alternating layers of clays, shales, sandstones and impure limestones which have been folded into more or less pronounced undulations, and the dome-shaped or anticlinal structures are those most favourable to the accumulation of oil pools in the sandy layers when these are sealed by impervious shales both below and above.

Yenangyaung, the most important of the oil fields of Burma, is a symmetrical elongated dome, some 6 miles long and 1 mile broad, but the producing area does not cover more than $1\frac{1}{2}$ square miles. The shallow sands have been worked for centuries by the Burmese. Modern machine drilling dates from 1887, and to-day some of the wells are over 3,000 feet deep. The output is about 200,000,000 gallons per annum.

In Assam, the Digboi field lies in the extreme north-east in the District of Lakhimpur. It yields about 5,000,000 gallons per annum. The Badarpur field is situated in Cachar, and in 1922 produced over 4,000,000 gallons.

Oil springs and seepages occur in the Attock, Mianwali, Rawalpindi, and other districts of the Punjab, but the only producing field at present is that of Khaur in the first-named district. In 1922 it yielded over 7,500,000 gallons of oil.

Specimens of crude oil and products manufactured from it are exhibited from the fields of Digboi, Badarpur and Attock.

Oils from the Digboi Field, Assam.

Presented by the Assam Oil Co., Ltd.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 898 | M.407 | Crude petroleum. (This and the following specimens are made in the refineries at Digboi.) |
| 899 | M.410 | Heavy fuel oil. |
| 900 | M.403 | Axle oil. |
| 901 | M.408 | Blue oil. |
| 902 | M.404 | Jute-batching oil. |
| 903 | M.409 | 70 deg. S.P. oil. |
| 904 | M.412 | Kerosene, "Chakphul" brand. |
| 905 | M.411 | Kerosene, "Lotus" brand. |
| 906 | M.406 | Petrol "A" brand. |
| 907 | M.405 | Petrol "B" brand. |
| 908 | M.415 | Paraffin wax. |

Oils from the Badarpur Field, Assam.

Presented by the Burma Oil Co., Ltd.

| Serial No. | Reg. No. | Description. |
|------------|----------|-----------------------|
| 909 | M.413 | Low flash crude oil. |
| 910 | M.414 | High flash crude oil. |

Oils from the Khaur Field, Punjab.

Presented by the Attock Oil Co., Ltd.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 911 | — | Crude petroleum. |
| 912 | — | Petrol. (This and the following specimens are made in the refineries at Rawalpindi.) |
| 913 | — | Kerosene, "Gorial" brand. |
| 914 | — | Kerosene, "Squirrel" brand. |
| 915 | — | Kerosene, "Hand and Sickle" brand. |
| 916 | — | Crank chamber oil. |
| 917 | — | Motor oil "A." |
| 918 | — | Motor oil "B." |
| 919 | — | Motor oil "C." |
| 920 | — | Light car oil. |
| 921 | — | "C.S." oil. |
| 922 | — | Machine "M" oil. |
| 923 | — | "S.C.S." oil. |
| 924 | — | "L.C." oil. |
| 925 | — | "H.S." oil. |
| 926 | — | Axle oil. |
| 927 | — | "R.E." oil. |
| 928 | — | "H.E." oil. |

PHOSPHATES.

THE most important occurrence of rock phosphate as yet discovered in India is the belt of apatite-magnetite rock which has been traced for some miles in the vicinity of Pathalgora, Singhbhum District, Bihar and Orissa. The ore occurs as lenses usually surrounded by biotite-schists. When cleared of magnetite the apatite is said to be of a high grade, containing over 80 per cent. of tricalcic phosphate.

Deposits of septarian nodules, containing from 56 to 59 per cent. of phosphate of lime, occur in the cretaceous beds of the Perambalur taluk of Trichinopoly District, Madras. They are collected and ground for use as a fertiliser on tea gardens, coffee plantations, etc.

Triplite, a phosphate of iron and manganese, is a common mineral in some of the mica-bearing pegmatite veins of the Gaya District, Bihar and Orissa.

| Serial No. | Reg. No. | Description. |
|------------|--------------------|--|
| 929 | 3,358 | Triplite, Gaya District, Bihar and Orissa. |
| 930 | J.215 | Triplite from a pegmatite vein, Gaya District, Bihar and Orissa. |
| 931 | L.691 | Apatite from a pegmatite vein, Monghyr District, Bihar and Orissa. |
| 932 | I.359 | Apatite with garnet and quartz from a pegmatite vein, Nellore District, Madras. |
| 933 | H.777 | Phosphatic nodule from brown shale, Mussoori, Dehra Dun District, United Provinces. |
| 934 | M.2,374 | Coprolites from the Lameta group, Eastern Berar. |
| 935 | I.390 } I.391 } | Phosphatic nodules, cretaceous beds, Utatur, Trichinopoly District, Madras. |
| 936 | M.320 | Phosphatic nodules, Trichinopoly District, Madras. Collected and ground for use as a fertiliser. Presented by Messrs. Staines & Co., Coimbatore. |
| 937 | L.971 | Apatite-magnetite rock, mined and treated for use as a fertiliser, Singhbhum District, Bihar and Orissa. Presented by Messrs. Shaw, Wallace & Co., Calcutta. |
| 938 | M.332 | Ground apatite from an apatite-magnetic rock, mined and treated for use as a fertiliser. Presented by the Indian Phosphates Syndicate. |

POTASSIUM SALTS.

POTASH salts, consisting of mixtures of sylvite (potassium chloride) and langbeinite (a double sulphate of potassium and magnesium), with kieserite (a hydrated sulphate of magnesium with potassium chloride) and common salt, were found in the Mayo Mines of the Salt Range of the Punjab in 1873. Later investigations have shown that they occur in thin seams, disconnected lenticles and irregular foliæ.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 939 | M.351 | Sylvite, langbeinite and kainite, Khewra Salt Mines, Punjab. |
| 940 | M.352 | Sylvite, kainite, langbeinite and common salt, Khewra Salt Mines, Punjab. |

RARE MINERALS.

THE mica-bearing pegmatites of the Nellore District in Madras and of the Gaya and other districts of Bihar and Orissa, have yielded many fine specimens of rare minerals. Amongst those exhibited are the following:—

Columbite, the nicbate and tantalate of iron and manganese.

Samarskite, a complex niobate and tantalate of uranium, the yttrium earths and iron.

Gadolinite, a silicate of yttrium, beryllium and iron.

Allanite, a hydrous silicate of calcium, aluminium, iron and the rare earths.

Pitchblende, the chief ore of uranium and radium.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 941 | 3,388 | Allanite from a pegmatite, Singhbhum District, Bihar and Orissa. |
| 942 | 16,235 | Tourmaline-pegmatite with cassiterite and gadolinite, Palanpur State, Bombay. |
| 943 | L.177 | Columbite, Gaya District, Bihar and Orissa. |
| 944 | 3,360 | Columbite, Gaya District, Bihar and Orissa. |
| 945 | L. 66 | Columbite, Gaya District, Bihar and Orissa. |
| 946 | 15,536 | Columbite, Nellore District, Madras. |
| 947 | 15,537 | Columbite, Nellore District, Madras. |
| 948 | L.668 | Monazite intergrown with columbite, Gaya District, Bihar and Orissa. |
| 949 | K.588 | Samarskite, Nellore District, Madras. |
| 950 | L.284 | Samarskite, Nellore District, Madras. |
| 951 | L.162 | Pitchblende, from a mica-bearing pegmatite, Gaya District, Bihar and Orissa. |
| 952 | L.303 | Nodules of pitchblende, surrounded by uranium ochres, |
| 953 | L.304 | in a quartz-felspar matrix, Gaya District, Bihar and Orissa. |

REFRACTORIES.

FIRE bricks are made from the fire clays of the Gondwana coalfields, and silica bricks for use in recovery coke ovens and metallurgical furnaces, from the ancient quartzites of the Monghyr District. Sillimanite, a silicate of aluminium, occurs in large radiating masses in the vicinity of Nongmaweit, in the Khasi Hills of Assam. It used to be mined on a large scale as an abrasive, but may prove more valuable as a refractory material, especially for use in glass furnaces.

Kyanite, another silicate of aluminium, is also included here. It is a common mineral in some parts of India.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 954 | L.969 | Raw fire clay, Raniganj coalfield, Bengal. Presented by Kumardhubi Fire Clay & Silica Brick Co., Ltd. |
| 955 | L.968 | Fire bricks, made from L.969. Presented by the same company. |
| 956 | L.970 | Quartzite, Monghyr District, Bihar and Orissa. Presented by the same company. |
| 957 | L.968 | Silica bricks, made from L.968. Presented by the same company. |
| 958 | 32,168 | Fibrous sillimanite, Khasi Hills, Assam. |
| 959 | 32,201 | Fibrous sillimanite, Khasi Hills, Assam. |
| 960 | 32,208 | Sillimanite with biotite, Khasi Hills, Assam. |
| 961 | 32,182 | Sillimanite with sphene, Khasi Hills, Assam. |
| 962 | J.424 | Kyanite, near Kurseong, Darjeeling District, Bengal. |
| 963 | 29,588 | Kyanite in quartz-biotite-schist, Balaghat District, Central Provinces. |
| 964 | M.1,955 | Kyanite with quartz and mica, North-West Himalaya. |

SALT.

INDIA produces over 1,500,000 tons of salt per annum. About 60 per cent. of this is derived from the solar evaporation of sea water carried on during the hot weather on the coasts of Bombay, Madras and Burma. Salt is also made from sub-soil and lake brine, especially in the desert region of Rajputana, from which about 250,000 tons are obtained every year.

About one-tenth of the output comes from the rock salt mines of the Salt Range of Kohat in the North-West Frontier, and of Mandi State in the Punjab. In the Mayo Mines at Khewra in the Salt Range there are five seams of pure salt of a total thickness of 275 feet. In Kohat, the salt resources are practically inexhaustible. At Bahadur Khel, the salt beds have a thickness of over 1,000 feet, and have been traced for about 8 miles.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 965 | M.263 | Large cube of white rock salt. Presented by the Northern India Salt Revenue Department. |
| 966 | M.264 | Large cube of pink rock salt. Presented by the Northern India Salt Revenue Department. |

SLATES.

| Serial No. | Reg. No. | Description. |
|------------|----------|---|
| 967 | 31/593 | Slate, Singbhum District, Bihar and Orissa. |
| 968 | L.990 | Plain, polished school slates, Kharakpur Hills, Bihar and Orissa. Presented by Ambler & Co., Calcutta. |
| 969 | L.991 | |
| 970 | L.992 | |
| 971 | L.993 | |
| 972 | L.994 | Roofing slates, Kharakpur Hills, Bihar and Orissa. Presented by Ambler & Co., Calcutta. |
| 973 | L.995 | |
| 974 | L.987 | Plain, polished slate stripes, Kharakpur Hills, Bihar and Orissa. Presented by Ambler & Co., Calcutta. |
| 975 | L.986 | |
| 976 | L.989 | |
| 977 | L.985 | Enamelled, slate stripes, Kharakpur Hills, Bihar and Orissa. Presented by Ambler & Co., Calcutta. |
| 978 | L.988 | |
| 979 | L.980 | Slate dishes of various kinds used in Hindu households, Kharakpur Hills, Bihar and Orissa. Presented by Ambler & Co., Calcutta. |
| 980 | L.981 | |
| 981 | L.982 | |
| 982 | L.983 | |
| 983 | L.984 | Roofing slates of various sizes, Kangra Valley, Punjab. Presented by the Kangra Valley Slate Co., Ltd. |
| 984- | M.292- | |
| 992 | M.300 | |

STEATITE.

STEATITE, soapstone or potstone, is a common mineral in India, where it is carved into images, bowls, plates and ornamental articles. There are large deposits near the Marble Rocks in the Nerbudda Valley of the Central Provinces, in the Singbhum District of Bihar and Orissa, in various parts of Southern India, and in Burma. Exceptionally large deposits of very fair quality occur at Mowa in the Jaipur State of Rajputana, and at Dev Mori, Idar State, Bombay.

| Serial No. | Reg. No. | Description. |
|------------|----------|--|
| 993 | L.142 | Steatite, Raiwala, Jaipur, Rajputana. |
| 994 | 5,676 | Steatite, Mora, Jaipur, Rajputana. |
| 995 | L.136 | Steatite, Somalapuram, Bellary District, Madras. |
| 996 | L.131 | Steatite, Ahtur, Salem District, Madras. |

| Serial No. | Reg. No. | Description. |
|---------------|-------------|---|
| 997 | I.126 | Steatite, Maddavaram, Karnul District, Madras. |
| 998 | I.144 | Steatite, Arakan Yomas, Kyaukpyu District, Burma. |
| 999 | K.827 | Steatite, Dev Mori, Idar, Bombay. |
| I,000 | I.140 | Steatite, Marble Rocks, Jabalpur District, Central Provinces. |
| I,001 | I.564 | Steatite, Marble Rocks, Jabalpur District, Central Provinces. |
| I,002 | II,279 | Potstone, Gaya District, Bihar and Orissa. |
| I,003 | J. 24 | Potstone, Singhbhum District, Bihar and Orissa. |
| I,004 | M.2,216 | Dish carved at Agra from steatite No. 5,676. |

STRONTIUM.

CELESTITE, the sulphate of strontium, has been found scattered over the surface of the Khirthar limestones of Kohistan in Sind. It also occurs in the Kohat District of the North-West Frontier Province, in Baluchistan, and in the Trichinopoly District of Madras.

| Serial No. | Reg. No. | Description. |
|---------------|-------------|--|
| I,005 | I. 66 | Celestite, pseudomorphous after fibrous gypsum, Mari Hills, Baluchistan. |
| I,006 | D. 61 | Celestite from the Nummulitic Limestone, Kohistan, Lower Sind, Bombay. |
| I,007 | I.555 | Celestite, Utatur, Trichinopoly District, Madras. |

SULPHUR.

NATIVE sulphur occurs near Sanni in the Kachi District of Kelat State, Baluchistan, and on the volcano of Barren Island in the Bay of Bengal, but these deposits are not known to be of any commercial importance. Large reserves of sulphur, however, are available in the lead-zinc-silver ores of Bawdwin in the Northern States of Burma, though the proposals to utilise them in the production of sulphuric acid have not as yet materialised.

| Serial No. | Reg. No. | Description. |
|---------------|-------------|---|
| I,008 | 6/700 | Native sulphur, solfataras on central cone, Barren Island, Bay of Bengal. |
| I,009 | I.372 | Native sulphur, Sanni Mine, Kelat, Baluchistan. |
| I,010 | 3,644 | Fused sulphur, prepared from crude native material, Sanghar Pass, Suleman Hills, Baluchistan. |

CLASS II.—MINERALS.

Group III.—Minerals of Scientific Interest.

Zeolites—

| | | | | | | |
|-----------------|----|----|----|----|----|----|
| Heulandite | .. | .. | .. | .. | .. | .. |
| Stilbite | .. | .. | .. | .. | .. | .. |
| Apophyllite | .. | .. | .. | .. | .. | .. |
| Scolecite | .. | .. | .. | .. | .. | .. |
| Laumontite, etc | .. | .. | .. | .. | .. | .. |

Forms of Silica—

| | | | | | | |
|--------------|----|----|----|----|----|----|
| Rock Crystal | .. | .. | .. | .. | .. | .. |
| Amethyst | .. | .. | .. | .. | .. | .. |
| Opal | .. | .. | .. | .. | .. | .. |
| Jasper | .. | .. | .. | .. | .. | .. |
| Chalcedony | .. | .. | .. | .. | .. | .. |

| | | | | | | | |
|-----------------|----|----|----|----|----|----|----|
| Agate | .. | .. | .. | .. | .. | .. | .. |
| Onyx | .. | .. | .. | .. | .. | .. | .. |
| Carnelian, etc. | .. | .. | .. | .. | .. | .. | .. |
| Tourmaline | .. | .. | .. | .. | .. | .. | .. |
| Kyanite | .. | .. | .. | .. | .. | .. | .. |
| Andalusite | .. | .. | .. | .. | .. | .. | .. |
| Nemalite | .. | .. | .. | .. | .. | .. | .. |
| Jadeite | .. | .. | .. | .. | .. | .. | .. |
| Bitumen | .. | .. | .. | .. | .. | .. | .. |
| Amber, etc. | .. | .. | .. | .. | .. | .. | .. |

VARIOUS INDIAN MINERALS.

| Serial No | Reg. No. | Description. |
|-----------|-------------|--|
| I,011 | M.2,194 | Heulandite with stilbite and apophyllite, Deccan Trap, Western Ghats, Bombay. |
| I,012 | 817 | Scolecite with stilbite, Deccan Trap, Western Ghats, Bombay. |
| I,013 | L.902 | Laumonite prisms with calcite, Bhorwada, Bombay. |
| I,014 | M.2,176 | Stilbite with heulandite, Deccan Trap, Bombay. |
| I,015 | 28,547 | Stilbite in Deccan Trap, Chhindwara District, Central Provinces. |
| I,016 | M.2,076 | Apophyllite with stilbite, Deccan Trap, Western Ghats, Bombay. |
| I,017 | 23,367 | Fine mass of stilbite crystals, Seoni, Central Provinces. |
| I,018 | M.2,119 | Scolecite with apophyllite and glauconite, Deccan Trap, Western Ghats, Bombay. |
| I,019 | M.2,170 | Cavity in Deccan Trap, lined with zeolites and quartz, Deccan Trap, Bombay. |
| I,020 | L.899 | Calcite in Deccan Trap, geode, Bhorwada, Bombay. |
| I,021 | 4,281 | Calcite, Merwara, Rajputana. |
| I,022 | 4,063 | Calcite, Bhorwada, Bombay. |
| I,023 | M.2,795 | Calcite with heulandite and glauconite, Deccan Trap, Western Ghats, Bombay. |
| I,024 | M.2,860 | Calcite (Hislopite), containing heulandite and glauconite, Nagpur, Central Provinces. |
| I,025 | M.1,185 | Portion of a geode of chalcedony, lined with rock crystal, Rajmahal Hills, Bengal. |
| I,026 | M.1,128 | Chalcedonic geode, interior composed of milky rock crystal with calcite, Rajmahal Hills, Bengal. |
| I,027 | 16,550 | Quartz geode, Indore State, Central India. |
| I,028 | M.1,184 | Nodular chalcedony with crystalline quartz, Rajmahal Hills, Bengal. |
| I,029 | J.142 | Stalactite opal, Bhopal State, Central India. |
| I,030 | 19,259 | Agate, Bhopal State, Central India. |
| I,031 | H.717 | Amethyst with chalcedony, Deccan Trap, Bombay. |
| I,032 | 27,324 | Green chalcedony with natrolite, Seoni District, Central Provinces. |
| I,033 | M.3,123 | Vein quartz containing cavities after specular iron ore, Chota Nagpore, Bihar and Orissa. |
| I,034 | 1,217 | Ribbon Jasper, Edalabad, Khandesh District, Bombay. |
| I,035 | 17,984 | Polished green jasper, Bhopal State, Central India. Presented by Her Highness the Begum of Bhopal. |
| I,036 | M.1,207 (b) | Green jasper, Deccan Trap, Narbada Valley. |
| I,037 | H.716 | Heliotrope, Kathiawar, Bombay. |
| I,038 | G.313 | Eighteen specimens of agates, etc., Deccan Trap, Narbada Valley, Central Provinces. |

| Serial No. | Reg. No. | Description. |
|---------------|-------------|---|
| I,039 | 29,200 | Jasper-conglomerate, Deccan Trap, Bombay. |
| I,040 | M. 33 | Agate pebbles, Cambay, Bombay. |
| I,041 | M. 36 | Carnelian, rough beads, Cambay, Bombay. |
| I,042 | M. 37 | Carnelian, rounded beads, Cambay, Bombay. |
| I,043 | M. 38 | Carnelian, polished beads, Cambay, Bombay. |
| I,044 | M. 35 | Carnelian, Cambay, Bombay. |
| I,045 | M.1,222 | Onyx, cut and polished, Deccan Trap, Narbada Valley. |
| I,046 | M.2,122 (a) | Sardonyx, cut and polished, Deccan Trap, Bombay, Narbada Valley. |
| I,047 | H.704 | Silicified palm wood, United Provinces. |
| I,048 | 11/887 | Fossil wood, Irrawaddy Valley, Burma. |
| I,049 | 11/396 | Silicified wood, Mikir Hills, Assam. |
| I,050 | I.240 | Green earth, Chhindwara District, Central Provinces. |
| I,051 | M.2,853 | Dark brown calcite, Deccan Trap, Mhow, Central India. |
| I,052 | I.312 | Bi-pyramidal quartz crystals, containing small crystals of anhydrite in a matrix of gypsum and anhydrite, Mari, Salt Range, Punjab. |
| I,053 | M.2,954 | Botryoidal aragonite on recent breccia, Spiti Valley, North West Himalaya. |
| I,054 | M.1,855 | Amazon-stone passing into reddish orthoclase, with quartz and mica, Trichinopoly District, Madras. |
| I,055 | I. 27 | Green tourmaline in quartz, near Sapphire Mines, Zanskar Range, Kashmir. |
| I,056 | M.1,918 | Schorl with fluorite, Sutlej Valley, North-West Himalaya. |
| I,057 | M.321 | Green fluorite, Chitral. |
| I,058 | 32,592 | Stellate clusters of tourmaline on joint plane in granite, Merwara, Rajputana. |
| I,059 | 31,703 | Kyanite, Singhbhum District, Bihar and Orissa. |
| I,060 | 13,540 | Kyanite in pegmatite, Nellore District, Madras. |
| I,061 | M.1,940 | Andalusite from schist, South Mirzapur, United Provinces. |
| I,062 | I.283 | Garnet, Jaipur, Rajputana. |
| I,063 | I. 25 | Spodumene, Zanskar Range, Kashmir. |
| I,064 | 3,489 | Cancrinite, Matheran Hill, Bombay. |
| I,065 | I. 20 | Nemalite, Afghanistan. |
| I,066 | H.973 | Nemalite, Afghanistan. |
| I,067 | I.716 | Jadeite, Uru River, Burma. |
| I,068 | I.425 | Hornblende Rock, Kashmir. |
| I,069 | K.797 | Serpentine, Kashmir. |
| I,070 | 27,219 | Diopside-blue spinel-serpentine rock, Seoni District, Central Provinces. |
| I,071 | L.656 | Bitumen from a cavity in basalt, Deccan Trap, Seuri, Bombay. |
| I,072 | M.367 | Burmite, Maingkwan, Upper Burma. |
| I,073 | I.371 | Burmite, Maingkwan, Upper Burma. |
| I,074 | L.512 | Red burmite, Maingkwan, Upper Burma. |
| I,075 | 7/841 | Long piece of flexible sandstone from Kaliana, Punjab. |

CLASS III.

Geological Maps and Sections

Photographs

Publications—Records of the Geological Survey of India

Memoirs do. do. do.

Palæontologia Indica

MAPS, SECTIONS, ETC.

| Serial No. | Description. |
|---------------|--|
| 1,076 | Outline map of India on a scale of 1 in. = 32 miles, showing the positions of the more important mineral deposits. |
| 1,077 | Outline map, showing the position of the iron ore ranges of Singhbhum and Orissa. Scale 1½ ins. = 1 mile, after H. C. Jones. |
| 1,078 | Outline map, showing the positions of the coalfields of India, excluding those of Baluchistan, the Punjab, Rajputana and Burma. Scale 1 in. = 16 miles. |
| 1,079 | Geological map of Bihar and Orissa. Scale 1 in. = 16 miles. By L. L. Fermor. |
| 1,080 | Geological map of the Raniganj Coalfield. Scale, 1 in. = 1 mile. By W. T. Blanford. Revised by R. R. Simpson and H. Walker. |
| 1,081 | Geological map of the Jharia Coalfield. Scale, 1 in. = 1 mile. By the late T. W. H. Hughes and T. H. Ward. Revised by G. A. Stonier. |
| 1,082 | Geological map of the Kurhurbaree (Giridih) Coalfield, and sections across the same. Scale, 2 ins. = 1 mile. By W. Saise, T. H. Ward and W. Adamson. |
| 1,083 | The Hutar Coalfield. Scale 1 in. = 1 mile. By V. Ball. |
| 1,084 | The Auranga Coalfield. Scale, 1 in. = 1 mile. By V. Ball. |
| 1,085 | The Southern Coalfields of the Satpura-Gondwana Basin, Scale, 1 in. = 4 miles. By E. S. Jones. |
| 1,086 | The Chinddwara Coalfields. Scale, 1 in. = 1 mile. By T. W. H. Hughes. |
| 1,087 | The Southern Coalfields of the Rewah-Gondwana Basin (Umaria, Korar, Johila, Sohagpur, Kurasia, Koreagarh and Jhilimili). Scale, 1 in. = 4 miles. By the late T. W. H. Hughes and Hira-Lal. |
| 1,088 | The Wardha Valley Coalfields and the Bandar Coalfields. Scale, 1 in. = 4 miles. By the late T. W. H. Hughes and F. Fedden. |
| 1,089 | Geological map of the Son Valley in Rewah State and parts of the Jabalpur and Mirzapur Districts. Scale, 1 in. = 4 miles. By R. D. Oldham. |
| 1,090 | Geological map showing the coal areas of Bengal and Bihar and Orissa. Scale, 1 in. = 4 miles. |
| 1,091 | Geological map showing the coal areas of Bengal and Bihar and Orissa. Scale, 1 in. = 4 miles. |
| 1,092 | Geological map of Sind and Baluchistan. Scale, 1 in. = 16 miles. By E. Vredenburg. |
| 1,093 | Geological map of Cutch. Scale, 1 in. = 4 miles. By A. B. Wynne and F. Fedden. |
| 1,094 | Geological map of North-Eastern Rajputana. Scale, 1 in. = 4 miles. By A. M. Heron. |
| 1,095 | Geological map of the Northern Shan States. Scale, 1 in. = 4 miles. By T. H. D. LaTouche. |
| 1,096 | Geological map of Idar State. Scale, 1 in. = 4 miles. By C. S. Middlemiss. |
| 1,097 | Geological map of the Arun River Valley, Tibet. Scale, 1 in. = 8 miles. By A. M. Heron. |

| Serial No. | Description. | | |
|---------------|--------------|----|---|
| 1,098 | .. | .. | Geological map of the Bellary District. Scale, 1 in. = 4 miles. By R. Bruce Foote. |
| 1,099 | .. | .. | Geological map of the Tavoy District, Burma. Scale, 1 in. = 4 miles. By J. Coggin Brown, A. M. Heron, S. Sethu Rama Rau and M. Vinayak Rao. |
| 1,100 | .. | .. | Geological map of the area around Narainganj, Mandla District, Central Provinces. Scale, 1 in. = 1 mile. By K. A. K. Hallows. |
| 1,101 | .. | .. | Geological map of North-Western India, showing the occurrences of petroleum. Scale, 1 in. = 16 miles. By E. H. Pascoe. |
| 1,102 | .. | .. | Geological map of the Panoba Area, Kohat District. North-West Frontier Province. Scale, 1 in. = 1 mile. By E. H. Pascoe. |
| 1,103 | .. | .. | Geological map of the Kotehri Area, Kohat District. North-West Frontier Province. Scale, 1 in. = 1 mile. By E. H. Pascoe. |
| 1,104 | .. | .. | Geological map of the Malgin Area, Kohat District. North-West Frontier Province. Scale, 1 in. = 1 mile. By E. H. Pascoe. |
| 1,105 | .. | .. | Geological map of the Jatta and Dharangi Areas, Kohat District, North-West Frontier Province. Scale, 1 in. = 1 mile. By E. H. Pascoe. |
| 1,106 | .. | .. | Geological map of the Chak Dalla Area, Attock District, Punjab. Scale, 4 ins. = 1 mile. By E. H. Pascoe. |
| 1,107 | .. | .. | Geological map of the country between Tuz Khurmata and Kifri, Mesopotamia. Scale, 1 in. = 1 mile. By E. H. Pascoe. |
| 1,108 | .. | .. | Geological map of the Kani Quadir Area, Mesopotamia. Scale, 1 in. = 1 mile. By E. H. Pascoe. |
| 1,109 | .. | .. | Geological map of the Himalaya. Scale, 1 in. = 40 miles. Compiled by the late Sir Henry Hayden. |
| 1,110 | .. | .. | Geological map of the Sub-Himalaya of Garhwal and Kumaun. Scale, 1 in. = 4 miles. By C. S. Middlemiss. |
| 1,111 | .. | .. | Sections across map No. 1,109— |
| | | | (a) Across the east end of the Kotah Dun. |
| | | | (b) Across the middle of the Dun and the Bhabar Kotah. |
| | | | (c) West of the Kalikhut Hill. |
| | | | (d) West of Ramnagar. |
| | | | (e) Across the country between the Kotah and Patli Duns. |
| | | | (f) Across the Sub-Himalayan zone, exhibiting its relations to the older zones. |
| | | | (g) Across the Sona River. |
| | | | (h) Section east of the Ganges. |
| | | | (i) Do. do. |
| | | | (j) West of Kalannia River. |
| | | | (k) Various sections across the Sub-Himalayan zone. |
| | | | (l) Do. do. do. do. |
| | | | (m) Do. do. do. do. |
| | | | (n) Do. do. do. do. |

Horizontal and vertical scales of all the sections,
2 ins. = 1 mile. By C. S. Middlemiss.

- 1,112 Geological map of Hazara. Scale, $\frac{1}{2}$ in. = 1 mile. By C. S. Middlemiss, assisted by W. B. D. Edwards and Hira Lal.
- 1,113 Sections across map—
 (a) In the slate zone from Sirban to Tansui.
 (b) In the slate zone from Kakool to Maira.
 (c) In the Nummulitic zone from near Sujkot to Mari Hill.
 (d) In the Nummulitic zone from near Jub to Sydpoor.
 By C. S. Middlemiss.
- 1,114 Geological panoramas illustrating map—
 (a) View looking S.W. from near Kalabagh.
 (b) Sirban Hill from N.
 (c) Looking N.N.E. from above Juswal Village.
 (d) View looking S. from Moorchpoori, E. Peak.
 (e) View W. along the slate zone from ridge S. of Juswal.
 (f) View E.S.E.-W.N.W. from Changla Gali Dak Bungalow. By C. S. Middlemiss.

PHOTOGRAPHS.

- 1,115 A view in the Sind Valley, Kashmere. By C. S. Middlemiss.
- 1,116 Frozen waterfall, Phari Tibet. By the late Sir Henry Hayden.
- 1,117 Mount Everest from Ronghu Camp. By A. M. Heron.
- 1,118 The Kanchinjunga Range from Nungpu. By K. F. Watkinson.
- 1,119 The Gorge of the Mekong in Yunnan. By J. Coggin Brown.
- 1,120 The Tavoy River, near Egani, Burma. By A. M. Heron.
- 1,121 Falls of the Narbada, near Dhari, Central Provinces. By the late E. W. Vredenburg.
- 1,122 Columnar structure in the Deccan Trap of Salsette Island, Bombay. By K. A. K. Hallows.
- 1,123 Gold Washing on the Chindwin River, Upper Burma. By J. M. Maclaren.
- 1,124 Gold Washing on the Chindwin River, Upper Burma. By J. M. Maclaren.
- 1,125 The Production of Salt by the Solar Evaporation of Brine, Sambhar Lake, Rajputana. By W. A. K. Christie.
- 1,126 Storage of Salt at Sambhar, Rajputana. By W. A. K. Christie.
- 1,127 Part of the Yenangyaung Oilfield, Burma. By E. H. Pascoe.
- 1,128 A Manganese Mine, Vizagapatam District, Madras. By the late Sir Henry Hayden.
- 1,129 Mining Mica, Nellore District, Madras. By T. L. Walker.
- 1,130 Cutting Mica, Nellore District, Madras. By T. L. Walker.
- 1,131 Pipe Stockyard, Kulti, Bengal. Presented by the Bengal Iron Co., Ltd.
- 1,132 Casting Railway Chairs at Kulti. Presented by the Bengal Iron Co., Ltd.

FORESTRY SECTION.

THE Forestry Section has been placed by the Government of India in the hands of Messrs. W. W. Howard Bros. & Co., the sole agents for the sale of timber on behalf of the Government. The whole of the exhibit has been organised and established by them, and any enquiries relating to any matter referring to this section should be addressed to the attendant in charge at the Exhibition at the office of the section, or to Messrs. W. W. Howard Bros. & Co. at their head office at 38 Trinity Square, London, E.C.3.

Ample stocks of timber in every kind of form ready for use and all information relating to conditions of sale can be obtained upon application, as well as any literature or references to works which have already been accomplished, and which would give the necessary guarantee for the works required for almost any kind which might be demanded.

In the India Pavilion the Forestry Exhibit will be found to the east of the Central Hall, and lies on both sides of the alley-way leading from the Colonnade at the east end of the Central Hall.

The Central Hall itself is panelled throughout in Laurel wood, the panels being of finely figured Laurel veneered on Indian Cedar (a wood most admirably adapted for this purpose), whilst the pillars of the Colonnade, panel framing, mouldings, and so on, are of solid Laurel. The work has been carried out by Messrs. White, Allom & Company, the architects of the India Pavilion, and affords a fine example of what can be achieved with this wood, which is found extensively in India and Burma.

The flooring of the Central Hall, which has been carried out by the Stanhope Flooring Company, Ltd., is of Gurjun, another timber obtainable in large quantities from India, Burma and the Andamans, and one which is extremely well adapted, and has already been extensively used for, work of this nature. But that it is equally suitable for an entirely different class of work will be seen in the dining-room in the Early English style, the whole of the panelling, mouldings, carvings and furniture having been constructed of Gurjun by the Chiswick Guild, and affording a good example of the possibilities offered by this excellent timber for artistic treatment, apart from its more utilitarian purpose as flooring material.

In contrast to the dining-room in Gurjun is a second dining-room, immediately behind it (which has been constructed by Messrs. Samuel Elliott & Sons), of Silver Greywood, which will especially appeal to those who like a light, yet soft, colouring. In colour this timber is somewhat reminiscent of Harewood, of which it is fully the equal for all purposes, and vastly superior to the stained Sycamore and Maple so frequently used in imitation of Harewood. The room is furnished throughout in Laurel, which forms a rich and pleasing contrast to the Greywood panelling.

Beyond these dining-rooms is a billiard room, constructed by Messrs. John Taylor & Sons, of Edinburgh, to the design of Mr. George Simpson, F.I.S.A., the room having been ordered by Mr. Roger for his residence, Dilkusha, Peebles, and this gentleman having kindly given permission for its exhibition at Wembley previous to its erection in his house. Not only has the room been decorated in Laurel, but the billiard table and the whole of the furniture, which have been manufactured by Messrs. Burroughes & Watts, have also been carried out in the same material, thus affording a very fine example of what is possible from the exclusive use of Laurel for all details.

At the western end of the dining-rooms is a lady's boudoir, comprising Coral Wood panels with Satini framing, and embellished with Rosewood

pilasters and mantelpiece. The work has been carried out by Messrs. Melliers, Ltd., and the bright golden shades of the Coral and Satini form an effective contrast to the rich purple-brown of the Rosewood, a material which has hitherto been confined almost exclusively to pianoforte manufacture, but which is equally well adapted to the purpose for which it has here been employed. The room is furnished in Coral Wood, the furniture having also been constructed by Messrs. Mellier.

Adjoining this boudoir is a room in which are shown large numbers of Indian and Burmese timbers in the form of planks and small hand samples. These timbers are all clearly named, and, in view of the quantity exhibited, conditions of space have precluded the list from being given in extenso in this catalogue. This room should prove of exceptional interest to Architects, Cabinetmakers and wood users generally, who after seeing the finished articles elsewhere will doubtless want to examine the raw material from which they have been constructed.

Passing out of these rooms, the visitor will find two staircases leading to the upper storey, that on the left being of Silver Greywood, and that on the right of Andamans Padauk, forming a fine contrast to each other, and giving an excellent idea of what can be accomplished in this direction by the use of these timbers.

In the centre of the upper storey are displayed the beautiful carved panels of Kashmir Walnut, formerly the property of His Majesty the King, by whom they have been presented to the Government of India.

In the upper storey will be found a large assortment of articles of all descriptions manufactured from Indian and Burmese woods. Special attention is directed to such exhibits as the Chancel screen and two Parcose screens in Koko, manufactured by Messrs. R. L. Boulton & Sons, for St. James' Church, Taunton, which are exhibited prior to erection in the Church by the kind permission of the owners, and an altar also in Koko, embellished with carvings in White Chuglam, the work of Messrs. G. M. Hammer. Here also will be seen two very striking bedroom suites, one in Silver Greywood and the other in Laurelwood, manufactured and exhibited by Messrs. S. Emanuel, Ltd., a firm which is also responsible for a number of other items, such as bookcases and writing tables in Padauk, wardrobes and dressing tables in Padauk, Laurel and Silver Greywood, and grandfather clocks in Laurel and Padauk. Koko is the wood employed for an exhibit of eight single and six arm chairs, the work of Messrs. G. Caffall, Ltd., and there is also a fine pair of eagle-headed arm chairs in Rosewood by Messrs. W. J. Lock. Messrs. J. B. Cramer are responsible for a boudoir grand piano in Pyinma, and a ship's piano in Teak, whilst other specimens of the pianoforte makers' art are furnished by a Player piano in Laurel (Allison Piano Company), a baby grand in Rosewood (British Pianoforte Manufacturing Company), and an upright piano in Padauk (J. Spencer & Co). Of the small articles exhibited attention may be drawn to the gramophones, crystal sets, and cash registers by Messrs. Holmes Bros., a large selection of clock cases by A. L. Canham & Sons, trouser and tie presses by the Acme Manufacturing Co., small tables, candlesticks, trays, brushes, mirrors, cigar boxes and tobacco jars, tennis rackets and hockey sticks, and musical instruments. These various articles, in the making of which a large variety of woods has been used, are all clearly labelled with the name of the material from which they are constructed, as also that of the manufacturer. Special attention is drawn to the revolving column exhibiting very high-class panels of 28 different woods, the work of G. Betjemann.

Descending the stairs and crossing the alley-way behind the Colonnade of the Central Hall, the visitor will find three more blocks in the Forestry

Section, of which one consists of work constructed by Messrs. Holloway Bros., for the Westminster Bank, who have given permission for its exhibition prior to its erection in their premises. The Bank furniture, desks, counters, and so on, are all constructed of Andamans Padauk, whilst the walls are panelled in finely-figured Pyinma, a wood which is rapidly coming into favour, and which is also admirably adapted for furniture and cabinet making. East of this is a block of shop fronts, the work of Messrs. F. Sage & Co., the timbers employed being Padauk, Rosewood and Silver Greywood. The work, which is a fine example of the latest ideas in shop-front fitting, presents a novel effect from the fact that the materials used differ from those ordinarily employed for this class of work. Beyond this is the last of the Forest exhibits, which consists of a ship's cabin by Messrs. Gill & Reigate, Ltd., constructed throughout of Teak, with beautifully figured panels of the same wood.

Outside the India Pavilion, in a boathouse, facing the Palace of Engineering, will be found a motor launch, 39 feet in length, planked in Teak specially cut from round logs and in full length from stem to stern, the combings, hatchways and deckhouses being in Padauk, the forecabin in Indian Silver Greywood, and the aft in Padauk. The launch has been built by the Hampton Launch Works, Ltd., and is fitted with a Thornycroft engine. Other exhibits here are a motor boat planked with Poon and fitted with White Bombwe and White Mahogany, a motor canoe planked with Indian Cedar, with ribs of Yellow Mulberry, and fitted with White Bombwe and Haldu, and a skiff planked with Indian Cedar, with ribs and sculls of Yellow Mulberry, these three latter boats being the work of Messrs. Salter, Bros.

Mention must be made of two other important works which, although they do not form part of the Indian Forestry Exhibit, have been constructed of Indian woods. These are Lloyd's Bank, which is situated at the end of the main road, running between the Palaces of Industry and Engineering, and which is furnished throughout in Andamans Padauk, and the doors and door frames of the Royal apartments, which have been constructed of the finest Laurel wood. Both these works have been carried out by C. Kerridge, Junr., of Cambridge.

In the Palace of Engineering, Avenue 11, Bays 26 and 29, will be seen two Pulman cars constructed by the Birmingham Railway Carriage and Wagon Company, Ltd. The whole of the framing and structural timbers are in Indian Gurjun wood, and the interior decorations are in one coach, Andamans Figured Padauk with Andamans Padauk Curl, and in the other Andamans Figured Padauk and Burma Padauk Curls. They are both extremely beautiful, comparing with the finest figured wood that the world can produce, and are well worth a special visit of inspection.

NOTE :—A detailed illustrated catalogue is available at the stall.

ARMY EXHIBIT

THE model forming this exhibit shows an area typical of the country found in the tribal area on the North-West Frontier of India. The scale is at 4 ins. to 1 mile, and for constructing the model an enlargement to this scale was made from the $\frac{1}{4}$ in. Survey of India Maps. In order to bring out hill features in a model of this size, the vertical heights have been doubled, that is to say, the vertical scale is at 8 ins. to 1 mile.

In addition to the topographical interest of the country, the area is of a great military importance, and has been the scene of our principal frontier expeditions of recent years. The difficult nature of the country, with its confused mass of mountains intersected by deep ravines, is clearly demonstrated in the model.

Tirah Model.

The model covers an area of 2,080 square miles in Tirah, the country of the Afridi and Orakzai tribes, which lies to the west of the frontier cantonments of Peshawar and Kohat.

In the north-east corner will be noted the Khyber Pass, the route followed from time immemorial by invaders from Central Asia on their way to the plains of India. It is now held by regular troops and is traversed by a double motor road. In addition, a broad gauge railway is now under construction to Landi Khana, close to the Afghan border. The country lying north of the Safed Koh range at the north-west corner of the model is Afghan territory.

Samana, the Sampagha Pass, the Arhanga Pass and Bagh, are names which will be familiar to many in connection with the Tirah Expedition of 1897.

Kohat Cantonment is seen in the south-east corner.

Photographs.

The series of photographs represents the different arms and services of the Indian Army. The principal classes enlisted are depicted, and the soldier is shown through progressive stages from the raw material to the fully trained man.

SURVEY OF INDIA

THE Survey of India Department, under the direction of Colonel C. H. D. Ryder, C.B., C.I.E., D.S.O., R.E., Surveyor-General of India, is specially concerned with all matters connected with the geodesy, geography, and cartography of the British possessions in India, the feudatory States, and adjacent countries more or less under British influence ; also with the Topographical Surveys in Indian states and hilly and less cultivated tracts in India, and with the Revenue or Cadastral Surveys in the cultivated areas of some provinces, the remainder having their own.

The operations of the Department are thus mainly divided into two distinct branches : Trigonometrical and Topographical ; the former is under the Superintendent, Trigonometrical Surveys, with his headquarters at Dehra Dun, in the United Provinces, and the latter under four Circle Superintendents, who are responsible for all surveys in their areas, with headquarters at Mussoorie in the United Provinces for the North of India, at Bangalore in Southern India for the South of India, at Shillong in Assam for the East of India and at Maymyo in Burma for the whole of Burma. These Circle Superintendents also act as professional advisers in Survey matters to the Local Governments whenever required.

The headquarter offices in Calcutta comprise the Surveyor-General's Office (Accounts and Correspondence) and that of the Superintendent, Map Publication, who has under his control No. 1 Drawing Office, the Engraving Office and the Map Record and Issue Office in one building, the Photographic and Lithographic Printing Office in another, and the Mathematical Instrument Office for the supply and repair of instruments in a third.

The Executive Staff of the Department consists of 64 Class I Officers, graded as Deputy and Assistant Superintendents, 94 Class II Officers graded as Deputy, Assistant and Extra-Assistant Superintendents, with a large staff of assistants in various grades of the Upper and Lower Subordinate Services.

The operations of the Trigonometrical Branch are essentially scientific, astronomical and geodetic, and form the foundation upon which the work of the other two branches is based. They include the various series of principal and secondary triangulation carried out by it, extending N. and S. from the Pamirs to Cape Comorin, and E. and W. from Bangkok to Baluchistan, also latitude observations, determinations of longitude (telegraphic and astronomical), tidal, levelling, magnetic and pedulum observations. A solar observatory is attached to the office at Dehra Dun, for the daily photographing of the sun to record sun-spots, etc. There are also magnetic and meteorological observatories.

The computing office of this branch at Dehra Dun undertakes the examination, reduction and publication of the trigonometrical, astronomical and other scientific observations, and the prediction of tides for 40 ports in India and on the neighbouring coasts, while the various charts and maps connected with the work are prepared in the Drawing Office and reproduced by photozincography in the photographic section, in which the maps of the Forest Surveys are also reproduced. There is also a well-equipped printing office for the preparation of the volumes embodying the scientific work of the branch, some of which are included among the exhibits.

The Topographical Surveys are, as already stated, under the immediate direction of the Circle Superintendents. They are carried out during the cold weather season, the fair maps being drawn at the various recess headquarters during the hot weather. The normal scale of survey is 1 in. to the mile, unimportant areas are generally surveyed on the $\frac{1}{2}$ in. and the sandy deserts of Sind, and barren areas on the $\frac{1}{4}$ in. scales. The modern surveys started on

the frontiers of India, which are mostly completed. In areas already cadastrally surveyed, reductions of these cadastral surveys are made use of and the topographical detail is added. The object is to obtain a cheap, rapid, and reliable first survey, carefully based on triangulation, for geographical and administrative purposes. In addition, plans are prepared of the principal towns and of all cantonments, within the area of survey operations.

In the Punjab, assistance is given to the provincial Revenue Survey Department, both in Riverain Surveys and in the "Rectangulation" of new areas to be brought under cultivation, owing to new irrigation schemes.

Circle Superintendents are also sometimes called upon to initiate the traverse framework of Indian States' future Cadastral Surveys.

The exhibits are typical of the work of the Department.

First, we have the 1 in. sheets surveyed, as a rule, on the same scale and drawn one third larger and reduced during publication by photography, then from these 1 in. sheets are compiled the half and quarter inch, the one-million and all the smaller scale maps. All the larger scale maps are helio editions, a good many of those on the smaller scales are engraved, and whenever such small scale maps are produced from reliable surveys, they will eventually be engraved.

Old style maps in black on the 1 in. and sometimes the 2 ins. scales exist for most of the areas not covered by the modern surveys; these, however, are being gradually replaced by coloured editions of modern surveys.

The exhibits have mostly been grouped as given below :—

| Heading. | Title of Map. | Scale. |
|--|---------------------------------|---------------------------------------|
| General | .. India, layered | .. 1 in. = 32 miles. |
| Do. | .. Do. political | .. 1 in. = 32 miles. |
| Small scale, engraved | .. Mysore | .. 1 in. = 16 miles. |
| Do. do. .. | .. India and adjacent countries | 1 in. = 64 miles. |
| Do. do. .. | .. Do. do. do. .. | 1 in. = 128 miles. |
| Do. do. .. | .. Southern Asia Series .. | .. 1/2,000,000 |
| Small scale, layered | .. South-Western Asia .. | .. 1/2,000,000 |
| Do. do. .. | .. 39, 58 and 78 .. | .. 1/1,000,000 |
| Provincial | .. Bihar and Orissa .. | .. 1/1,000,000 |
| Do. | .. Burma | .. 1 in. = 32 miles. |
| Do. | .. Bengal | .. 1/1,000,000 |
| International .. | .. N.F. 43 | .. 1/1,000,000 |
| ("La Carte Internationale du Monde"), engraved and layered | N.G. 45 | .. 1/1,000,000 |
| Maps showing the same area on different scales | 53 H/2 | .. 1 in. = 1 mile. |
| | 53 H/NW | .. 1 in. = 2 miles. |
| | 53 H | .. 1 in. = 4 miles. |
| | 53 Political | .. 1/1,000,000 |
| | 53 Layered | .. 1/1,000,000 |
| Miscellaneous .. | .. Simla Town Guide Map .. | .. 8 ins. = 1 mile. |
| Do. | .. Mount Abu | .. 6 ins. = 1 mile. |
| Statistical | .. India showing forests .. | .. 1 in. = 48 miles. |
| Do. | .. Cotton | .. 1 in. = 160 miles. |
| Do. | .. Wheat | .. 1 in. = 160 miles. |
| Do. | .. Sesamum | .. 1 in. = 160 miles. |
| Do. | .. Rice | .. 1 in. = 160 miles. |
| Do. | .. Bajra | .. 1 in. = 160 miles. |
| Do. | .. Tea | .. 1 in. = 160 miles. |
| Aeroplane Mosaic .. | .. City of Bagdad .. | .. 12 in. = 1 mile (approximately) |

| Heading. | Title of Map. | Scale. |
|----------------------|--|------------------------|
| Old Manuscript | Rajahmandry Circar. By Capt. Snell. Years 1821-24 | 1 in. = 4 miles. |
| Do. | Madras Surveys of the Military Institution, North Arcot. Years 1805-14 | 1 in. = 1 mile. |
| Index Charts | For 1/2 M. Publications | 1/40,000,000 |
| Do. | For 1/M | Do. 1/30,000,000 |
| Do. | For 1/M (internat.) | Do. 1/30,000,000 |
| Do. | For 1/4 in. | Do. 1 in. = 192 miles. |
| Do. | For 1/2 in. | Do. 1 in. = 192 miles. |
| Do. | For 1 in. | Do. 1/6,000,000 |

| | Scales | 1 in. | 1/2 in. | 1/4 in. |
|--|---|---------|---------|-----------------|
| Maps showing as far as possible typical Physical features of provinces | Burma.. .. | 95 L/11 | 92 D/SW | 93 O |
| | Assam | 83 M/11 | 83 J/NW | 78 O |
| | Bengal.. .. | 79 B/6 | 78 P/NW | 79 B/15 (1 in.) |
| | Bihar and Orissa | 72 L/8 | 73 F/NE | 73 B. |
| | United Provinces | 53 J/3 | 63 B/SW | 53 L. |
| | Central Provinces and Central India | 55 B/4 | 55 G/NW | 64 A |
| | Punjab | 44 J/15 | 44 E/SW | 43 C. |
| | Kashmir and Jammu | 43 J/16 | 43 L/NE | 43 F. |
| | Baluchistan and N.W. Frontier | 34 J/10 | 39 B/SE | 38 O |
| | Bombay | 47 F/15 | 46 K/SW | 46 P |
| | Hyderabad | 56 C/7 | 56 F/SE | 56 E. |
| | Madras | 66 C/3 | 57 O/SE | 58 B |

| | | | |
|------------------------------------|---------------------------------------|-------------|---|
| Photo-Litho Reproduction Processes | Map Reproduction Process Work | Board Do. | — |
| Folios | Rennell's Map of Bengal .. | Various. | |
| Do. | Layered Edition Sheets of India | 1/1,000,000 | |
| Do. | Political Edition Sheets of India | 1/1,000,000 | |
| Catalogue | Surveys and Scales on which published | | — |

Photographs of—

MAJOR JAMES RENNELL, F.R.S.

One of the most distinguished of English geographers. Appointed Head of the Surveys in Bengal in 1767, and, although not so styled, may be considered as the First Surveyor-General of India.

COLONEL W. LAMBTON, F.R.S.

The originator and first superintendent of the Great Trigonometrical Survey, 1800-1823.

COLONEL SIR GEORGE EVEREST, C.B., F.R.S.

Surveyor General of India from 1830 to 1843, and with Colonel Lambton responsible for the Great Meridional Arc of India. His name has been immortalised in Mount Everest, the highest mountain in the world.

The "Trigonometrical" exhibits comprise the following :—

The old chart of the Great Trigonometrical Survey operations, showing triangulation, azimuth, precise levelling, tidal stations and gravity determinations combined.

Four new charts on scale of $1/12$ M showing geodetic operations of the Survey of India, separately, viz. :—

Gravity determinations.

Astronomical determinations.

Triangulation.

Precise levelling and tidal stations.

Miscellaneous charts :—

A chart showing the form of the *Geoid* in India.

A chart showing tidal predictions.

Four charts on scale of $1/8$ M, showing for the epoch 1920.0 the characteristics of the magnetic elements of declination, horizontal force and total force.

Various photographs of instruments and observatories, viz. :—

(1) Zenith Telescope, No. 1.

(2) Zenith Telescope, No. 2.

(3) Strange's zenith sector.

(4) 12 in. transit theodolite.

(5) Tide predicting machine, front.

(6) Tide predicting machine, back.

(7) Dome Observatory, Delhi Dun.

(8) 12 in. photo heliograph observatory, Delhi Dun.

LIST OF PROFESSIONAL VOLUMES.

(1) *G.T. Volumes.*

(a) No. 11.—A History and General Description of the Reduction of the Principal Triangulation.

(b) No. XVI.—Tidal Observations from 1873 to 1892, and the Methods of Reduction.

(c) No. XVII.—Telegraphic Longitudes during the Years 1894-95-96. Arcs from Karachi to Greenwich.

(d) No. XVIII.—Astronomical Latitudes from 1885 to 1905, and the Deduced Values of Plumb-line Deflections.

(e) No. XIX.—Levelling of Precision in India from 1858 to 1909.

(2) *Professional Papers.*

(a) No. 14.—Refraction. Formulæ for Atmospheric Refraction and their Application to Terrestrial Refraction and Geodesy.

(b) No. 15.—Pendulums. The Pendulum Operations in India and Burma, 1908-13.

(c) No. 16.—Geodesy. The Earth's Axes and Triangulation.

(d) No. 17.—Isostasy. Investigations of Isostasy in Himalayan and Neighbouring Region.

(e) No. 18.—Isostasy. A Criticism of Mr. R. D. Oldham's Memoir, "The Structure of the Himalayas and of the Gangetic Plain."

(f) No. 19.—Aerial Photography. Experiments in Aeroplane. Photo Surveying.

(3) Triangulation pamphlets 53 A, B, C, D, E, F, G, H, with addendum I, J, K, L, M, N, O and P.

(4) Levelling pamphlet No. 53.

(5) Tide Tables for 1924, Parts I and II.

CO-OPERATION AND EDUCATION

CO-OPERATION is represented by exhibits from Bengal, Madras, Baroda, and Cochin. The charts, especially those from Bombay, give an idea of the growth of Co-operation in India. According to the latest figures for British India, as shown in *Statements showing the Progress of the Co-operative Movement in India during the year 1922-23* (sold in the Commercial Intelligence Section in the Indian Pavilion), there are no less than 56,136 societies with a membership of 2,102,446 and a total capital of about £24,000,000—a remarkable growth since 1906-7, when the number of societies was 740 only, the membership 890, and the capital a quarter of a million sterling.

EDUCATION. The exhibits from Bombay, the Central Provinces, Bihar and Orissa, the Punjab, Baroda, Travancore and Cochin give a fair idea of the excellent work done in schools, especially in embroidery, needlework, and kindergarten. There are useful charts from Bombay, Baroda, Travancore, and Cochin, and some excellent photographs from Dacca, Baroda and Travancore. A model of khedda operations or elephant catching in Mysore is an interesting exhibit in this section, and it affords a contrast to the pit system to be seen in the Forest Section in the Madras Court. The following statistics extracted from *The Report of the Progress of Education from 1917 to 1922*, will be of interest—

Number studying in Colleges and Schools.

| | | | | |
|------|----|----|----|-----------|
| 1917 | .. | .. | .. | 7,851,946 |
| 1922 | .. | .. | .. | 8,381,350 |

Total expenditure on Colleges and Schools.

| | | | | |
|------|-----|-----------------|---|-------------|
| 1917 | 11½ | crores or about | £ | 7,525,000 |
| 1922 | 18½ | „ | „ | £12,250,000 |

Number of Universities.

Between 1857 and 1887, five, all “affiliating.”

Since 1916, nine new Universities, seven of them
“Unitary Teaching” Universities, have
come into existence.

Exhibits.

BOMBAY—

Framed mounting boards showing specimens of Indian embroidery.

Gold and silver jig work.

Photographs showing schools and classes at work, system of visual instructions, school games, etc.

Dressed dolls.

Baskets and flower baskets.

Clay models of Indian household utensils, and vegetables and fruits.

Bead board and bag.

Palanquin.

Cloth label.

Map showing the system of education in Bombay.

Model of housing society at Willingdon Colony.

Lacquer works of cups, boxes, utensils, flower vase, dumbbells, etc.

BOMBAY.—*Contd.*

Silk cloth. Bodice cloth.
Sarees. Carpets.
Cotton shirtings.
Cotton and mercerised socks and stockings.
Photographs and charts (co-operative).

CENTRAL PROVINCES—

Photographs of schools and colleges.
Dresses (provincial).
Purse. Handkerchief.
Fan. Drawings.
Maps. Charts.
Specimen of Hindi handwriting.

TRICHUR—

Drawn thread work.
Embroidery. Tatting.
Lace. Drawings.
Sand modellings. Maps.
Paper models. Bead work.
Prick work. Gold lace veil.
Coloured chart showing secondary education in Cochin.
Photograph.
Clay models of different fruits.
Models of mattings.
Paintings.
Purse made of plantain fibre.
Purse made of Pappya plant fibre.
An edanganzhi measure made of coir.
Penholders made of mid-ribs of coconut leaf.
Fancy letter box.
Velvet cushion. Teapoy cover.
Clay model image of Malaha.
Travelling box of wood.
Coat stand.
Embroidered picture of church.
Bunch of pepper.

BARODA LIBRARY DEPARTMENT—

Diagrams showing population, etc.
Photos (cinema show to mill hands, etc.).
Specimen of travelling library box.
Works of Gaekwar Oriental Series.
Books in travelling library.
Charts and diagrams in reference to education.
School photos. School paintings.
Dried specimen of botanical collections.
Needlework.
Inkstand, lettercase, telegraphic key, keyboard, brushboard, chalkstand.
Charts from Director of Commerce.

TRAVANCORE—

| | |
|--------------------------|------------------|
| Educational photographs. | Paper models. |
| Flower basket. | Fancy palanquin. |
| Palmeapah car. | Pictures. |
| Paper jewel casket. | Toy cart. |

TRAVANCORE—*contd.*

Bilingual folding globes, etc.
Chess board.
Photo frame with inlaid silver.
Drawings and paintings and maps.
Black wood tray.
Carved coconut shell with chain.
Clay models.
Ivory image of Krishna, with flute.
Cardboard coconut.
Manual training blotter.
Educational photographs.
Portraits and paintings and maps.
Graphic history. Cushion cover.
Educational charts.

BIHAR AND ORISSA—

Pencil drawings (Nature studies).
Chalk do. do.
Photographs of schools.
Do. clay models.
Charts showing rainfall and temperature.
Life history of butterfly.
Guava fruit. Collection of grasses.
Drawings (water colour).
Historical and Agricultural maps.
Plan of residence of officers.
Plan of colleges.
Portrait of a head typical of the Provinces.
Cane tea table and chair and basket.
Helmet case.
Steel instruments manufactured at schools.
Various block types.
Aloe fibre hat and basket.
Grass basket and bamboo basket.
Palm leaf basket.
Palm leaf woven map. Grass broom.
Embroidered blouse, purse.
Tailored jackets, frocks, etc.
Crochet and lace work.
Gold and silver thread woven wools.
Tables (wood).
Shoes and pumps (leather and embroidered).
Maps of India and South America.

PUNJAB—

Charts (educational).
Photographs of schools and colleges.
Drawings (frame mounted). Graphs.

MADRAS—

| | |
|-----------------|--------------------|
| Pugri turbans. | Lace upper cloth. |
| Lace saree. | Chennmalai towels. |
| Photographs. | Glass showcase. |
| Bhavani carpet. | Jaggery. |
| Bone dust. | Brass post. |
| Mat. | |

Commercial Intelligence

Visitors who wish to obtain information regarding Indian trade or Indian industries are invited to apply at the Commercial Intelligence Bureau. They will find there a wide selection of publications of the Government of India and of Local Governments on commercial subjects, which may be consulted free of charge or purchased at moderate prices. Maps and diagrams are on view. The leading Indian newspapers and directories are available for perusal. Intending purchasers of periodical publications of the Government of India, such as "Monthly Sea-borne Trade Accounts," or the "Indian Trade Journal," may pay their subscription for the year and will receive successive issues promptly as they appear. Enquiries are welcomed. Visitors who are anxious to know more about India and its vast population, its fertile fields and wide forests, its mineral wealth, its manufacturing industries, its railways and canals, its financial and commercial system, should make a point of applying at the Bureau. The Curator will see enquirers personally, and will furnish them with full information from the wide range at his disposal.

INDIAN COTTONS

THIS exhibit has been arranged by the Indian Central Cotton Committee. The Committee was originally appointed by the Government of India in 1921, and is concerned with all matters connected with the improvement of cotton growing and cotton marketing in India. It was permanently incorporated by Act XIV of 1923, of the Indian Legislature (The Indian Cotton Cess Act).

The stall has been constructed in India from Indian materials.* The cloth covering the stall was presented by Messrs. Tata, Sons & Co., and was made in their mills.

The exhibit is intended to demonstrate principally the commercial aspect of Indian cotton production. New varieties resulting from the work of the Agricultural Departments are only exhibited where these have reached a commercial scale. Bales of important commercial types are shown on the central stand and adjoining these are shown a few of the Bombay arbitration standards. A complete set of these is available for reference and can be consulted on application to the Supervisor. These copies of the arbitration standards have been presented by the East India Cotton Association, Ltd., Bombay.

A number of the publications of the Indian Central Cotton Committee can be purchased from the Supervisor. With this exception the exhibits are not for sale.

Attention is drawn to the cotton maps of India and to the charts illustrating cotton statistics. These demonstrate India's position as a cotton producer in the Empire. It will be observed that, although broadly speaking it is true that India grows principally very short staple cotton, the total production of cottons of medium staple (*i.e.*, cottons suitable for counts of 20s. and upwards) is considerable, and that there is a definite exportable surplus of such cottons. Though that surplus is small when considered as a percentage of the total production, it is capable of materially adding to the supply of cotton produced in the Empire which can be substituted for ordinary American cotton.

* The Stall is for sale at the end of the Exhibition.

In order that visitors may have an opportunity of judging the staple of these cottons conveniently, in the majority of cases the exhibit includes a sample of card silver as well as a sample of cotton.

LIST OF EXHIBITS

BALED COTTON (opened bales):—Central Stand.

Bombay—

1. BROACH—

| | Bales per annum |
|------------------------------------|--------------------|
| Average production, Broach | 250,000 |
| Dholleras | 450,000 |
| | <hr/> |
| | 700,000 |

Staple, $\frac{7}{8}$ in. to 1 in..

SURAT—

Best type of broach, average annual production of Surat .. 30,000
(See small sample, 1,027 A.L.F., the pure strain of 1 in. staple now grown in the greater part of the Surat district.)

2. KUMPTA-DHARWARS—

| | |
|---|---------|
| Average production | 260,000 |
| (a) <i>Dharwar No. 1.</i> Selected Kumpta staple $\frac{7}{8}$ in. (a selected uniform type introduced by the Agricultural Department. Present production about | 10,000 |
| (b) <i>Gadag No. 1.</i> Selected Dharwar American (upland—acclimatised American). Present production .. about | 12,000 |
| (Staple 1 in. The cotton is best known to the trade as “Saw ginned Dharwar,” much of it is now roller-ginned.) | |

3. OOMRAS (*Cottons*)—

Central Provinces and Berar, Central India, Hyderabad and Khandesh Division of Bombay.

| | |
|---|-----------|
| Production | 1,100,000 |
| or including Khandesh | 1,400,000 |
| (a) Berar cotton. Staple $\frac{4}{8}$ in. to $\frac{6}{8}$ in. | |
| (b) C.P.1 (Central Provinces), cotton. Somewhat superior to Berar in staple. The small exhibits under the Central Provinces show the different types contained in the mixed cottons grown in the Oomra tracts. | |
| (c) HYDERABAD (<i>Gaorani</i>). Production about | 350,000 |
| Long staple. The original “Bani” cotton of Central India—Staple 1 in. to $1\frac{1}{8}$ ins. | |

Madras—

4. TINNEVELLY COTTONS—

| | |
|---|--------|
| Production, 1923-24 | 95,000 |
| (a) Commercial sample of Tinnevelly. | |
| (b) Karunganni (Company No. 3). Staple $\frac{7}{8}$ in. A purified Tinnevelly now produced to the extent of about .. | 50,000 |
| (Rapidly replacing mixed Tinnevelly.) | |

5. CAMBODIA AND SALEMS—

| | |
|--|---------|
| Production, 1923-24 | 140,000 |
| <i>Cambodia Cotton</i> — | |
| Introduced by the Agricultural Department, production .. | 122,000 |
| (a) Commercial (Tiruppur Cambodia). Staple 1 in. | |

Madras—contd.

(b) Cambodia pure strain, 295, staple 1 1/16 ins. (replacing ordinary Cambodia in general cultivation).

(c) *Uppam*.

(Principal constituent of Salems), staple 6/8 in.

Bales
per annum.

6. WESTERNS AND NORTHERNS—

Production 1923-24 90,000

Staple ordinary Northerns $\frac{7}{8}$ in., Westerns 6/8 in.

(a) Ordinary Northerns, staple $\frac{7}{8}$ in.

(b) Sircar 14, selected Northerns. Staple, 15/16 in. to 1 in.
Present production about 2,000

(c) Sircar, 25 selected Westerns. Staple $\frac{7}{8}$ in. Present production about 3,000

7. COCONADAS—

Production 41,000

Staple, $\frac{5}{8}$ in. to $\frac{7}{8}$ in. (very variable).

Punjab—

Punjab American production, 1923 crop 230,000

(a) Lyallpur, 4 F. Staple, 15/16 in.

(b) Lyallpur, 285 F. Staple, 1 1/16 ins.

(c) Lyallput, 289 F. Staple, 1 $\frac{1}{8}$ ins.

Bengals—

Average production Bengals (including Sind-Punjab and United Provinces) 800,000

United Provinces. Average staple, 4/8 in. to $\frac{5}{8}$ in.

(a) Aligarh 19. Staple $\frac{1}{2}$ in.

(b) J.N. 1. Staple $\frac{3}{4}$ in.

(c) K 22 (Leake's Hybrid), $\frac{3}{4}$ in.

Burma—

Estimated Production Crop, 1923-1924 55,000

(a) Wagyi (Prom machine ginned), staple 6/8 in.

TYPE BALES—

The tall bale on the left of the stand illustrates the usual type of Indian export bale (400 lbs.). The 500 lbs. "Octopus" bale, in the opposite corner illustrates a type used for some Madras and Burma cottons.

Note.—The principal types only have been shown, and wherever possible those improved types, the introduction of which, by the Agricultural Departments, has reached a commercial scale. A separate pamphlet describing the cottons can be obtained from the demonstrator-in-charge of the exhibit on application.

EAST INDIA COTTON ASSOCIATION STANDARDS.

A complete set of the Bombay arbitration standards (for grade) has been presented by the East India Cotton Association. A few of these are shown on the central stand. The other standards can be consulted on application to the Demonstrator. It is not possible to expose them to the light throughout the exhibition without destroying their representative character.

For further particulars see special pamphlet.

| Name of Standards. | Hedge Contract to which applicable. | Remarks. |
|---|---|--|
| Surat : Superfine, Fine, Fully Good. | Broach | Basis Fully Good. For cotton tendered as "Surat," a minimum staple of $\frac{7}{8}$ in. is required. |
| Punjab-American : Fine, Fully Good, Good. | Do. | Basis Fully Good. Minimum staple length $\frac{6}{8}$ in. |
| Saw-ginned Dharwar : Fine, Fully Good, Good. | Do. | Basis Fully Good. Fair average staple of season. |
| Cambodia : Fully Good, Good, Fully-Good-Fair. | Southerns | Basis is Good. Minimum staple tenderable, $\frac{7}{8}$ in. |
| Northerns : Fully Good, Good, Fully-Good-Fair. | Do. | Do. do. |
| Karunganni : Fully Good, Good, Fully-Good-Fair. | Do. | Do. do. |
| Kumpta : Fully Good, Good, Fully-Good-Fair. | Do. | Do. do. |
| Berar : Superfine, Fine, Fully Good. | Fine Oomras | Basis Fine. Fair staple. |
| United Provinces : Superfine, Fine, Fully Good. | Bengals | Basis Fully Good. |

General Diagrams, Etc.—

1. Cotton map of India—
 - (a) Varieties.
 - (b) Density of cultivation.
2. Photographs of types of Indian cotton (Leake).
3. Coloured plates. Botanical classification of Indian cottons. Gammie (placed in the appropriate provincial exhibits).
4. Diagrams illustrating—
 - (a) Staple of Indian cotton crop.
 - (b) India's contribution to the world's cotton supply.
 - (c) Distribution of Indian cotton.
5. Insect pests of cotton in India (arranged by the Imperial Entomologist).

DETAILED EXHIBITS ARRANGED BY PROVINCES.

Note.—The Card sliver specimens are included in order to show "staple." Trade visitors are invited to pull short lengths for examination.

Punjab—

1. Wall map showing the cotton growing area in relation to the canal irrigation area.
2. Three charts illustrating cotton production. Note the steady replacement of the indigenous (Bengals type) short staple cotton by Punjab-American.
3. Nine herbarium sheets illustrating the cottons of the Province.
4. Six photos of growing cotton plants.
5. Ginned cotton, unginned cotton, cotton bolls and combed seeds (showing fibre length) and card sliver of the following varieties :—

INDIGENOUS SHORT STAPLE—

- (a) *Gossypium Sanguineum*, No. 27.
- (b) Do. do. No. 124.
- (c) *Gossypium neglectum* van Rosea.
- (d) Do. *indicum* van Mollisoni.

PUNJAB-AMERICAN (*G. hirsutum*)—

- (e) (i) Lyallpur 4 F. Roller ginned.
- (e) (ii) Do. 4 F. Saw ginned.
- (f) (i) Do. 285 F. Roller ginned.
- (f) (ii) Do. 285 F. Saw ginned.
- (g) (i) Do. 289 F. Roller ginned.
- (g) (ii) Do. 289 F. Saw ginned.
- (h) Do. 290 F. Roller ginned.

Bombay Presidency—

I. SIND—

- (1) Map illustrating the extension of the cotton-growing area which the Sukkur Barrage Canal scheme will make possible.
- (2) Photo of Government cotton farm.
- (3) Ginned cotton, unginned cotton (*kapas*), cotton bolls, combed seeds and card sliver of the following varieties—
 - (a) 27 N. Sind desi (indigenous cotton).
 - (b) Punjab 4 F. (grown now where perennial irrigation is available).
 - (c) Durango Imported varieties under trial.
 - (d) Webber 49/4 Do. do. do.
 - (e) Webber (Delta type) Do. do. do.
 - (f) Hartsville Do. do. do.

II. GUJERAT (Surat—Broach—Dholleras)—

Ginned cotton, bolls, card sliver and combed seeds of the following varieties—

- (a) Pure Broach deshi.
- (b) Surat 1 A (long boll type).
- (c) Surat 1 A (cylindrical type).
- (d) Surat 1027 A.L.F. (selection now in general cultivation in Surat district).
- (e) Surat B.D. 5. Wilt resistant (new variety).
- (f) Goghari (short staple Broach cotton, which is being replaced as rapidly as possible by longer staple strains).
- (g) Wagad. The true Dholleras type.

Note.—The types shown here illustrate the cottons grown in the Gujarat Division of Bombay Presidency, in the Baroda State, and also in Rajpipla State and adjoining Indian States.

III. KHANDESH (short staple area), Cottons—

Bolls, card sliver and combed seeds of—

- (a) Khandesh Roseum (indigenous type).
- (b) Bani-Comilla cross. Dhulia Farm.

IV. KARNATAK (Kumpta-Dharwars)—

Ginned cotton, kapas, bolls, card sliver and combed seeds of the following cottons—

- (a) Kumpta.
- (b) Dharwar-American.
- (c) Gadag No. 1—Selected Dharwar-American.
- (d) Dharwar No. 1—Selected Kumpta.

Madras—

- 1. Cotton map of the Madras Presidency.
- 2. Graphs showing loss of crop by bud and boll shedding.
- 3. Diagrams showing the production of cotton in Madras.
 - Ginned cotton, bolls, kapas and seed, card sliver, and combed seeds of the following, with "Sorter" diagrams of the more important—
 - (a) (i) Tinnevely.

Madras—*contd.*

- (a) (ii) Karunganni (Company No. 3).
- (b) (i) Northern.
- (b) (ii) Sircar No. 14—improved Northern.
- (c) (i) Western.
- (c) (ii) Sircar No. 25—improved Western.
- (d) (i) Cambodia.
- (d) (ii) Cambodia pure strain 295.
- (e) Uppam (Salems).
- (f) Coconadas.

Mysore State—

- (1) Cotton and combed seeds of—
 - (a) Mysore-American, II.
 - (b) Mysore-American III.
 - (c) Selection 45.
 - (b) Selection 69 with card sliver of Sannahatti 69.
- (2) Combed seeds and photos of various new types under experiment.

Burmah—

- 1. Ginned cotton, kapas, card sliver, bolls and combed seeds of—
 - (a) Burma “Wagale” (Myingyan), short staple *G. neglectum*.
 - (b) Burma “Wagyi” (Prom Machine ginned). Medium staple cotton. *G. obtusifolium*.
 - (c) Shan States cotton.
 - (d) Burmah Cambodia.
- 2. Combed seeds and specimens illustrating results of the Burmah cotton survey (still in progress).

United Provinces—

- 1. Cotton map of the United Provinces.
- 2. Photos of experimental cotton fields.
- 3. Cotton, kapas, bolls, card sliver and combed seeds of —
 - (a) A.19 (Roseum type of Bengals).
 - (b) K.22 (Leake's hybrid).
 - (c) J.N.1 (Superior staple type).

Central Provinces and Berar—

- 1. Cotton maps of the Central Provinces and Berar, showing—
 - (a) Density of cotton cultivation.
 - (b) Distribution of trade varieties.
- 2. (a) (i) Bani cotton (*G. indicum*).
- (a) (ii) Pressed sample of Hyderabad Gaorani or Bani.
- (b) *Gossypium neglectum* var Rosea.
- (c) Do. do. Malvense.
- (d) Do. do. Verum.
- (e) Chanda Jari cotton.
- (f) Cambodia cotton—Sindewahi Farm.

Supply of Information—

- 1. A pamphlet describing the cottons exhibited can be obtained free on application.
- 2. The publications of the Indian Central Cotton Committee will be on sale at the stall.
- 3. For further technical information reference may be made to the Indian Trade Commissioner (Office of the High Commissioner for India) or to the Empire Cotton Growing Corporation.
- 4. Requests for information may be entered in the enquiry book maintained by the Demonstrator-in-Charge of the stall.

TEA EXHIBIT

The following are being shown :—

- (1) A Tableau or Panorama of an Indian Tea Garden, 29 ft. by 12 ft., showing Indian women plucking tea, factory, manager's bungalow, coolie lines, etc., painted by the well-known scenic artist, Mr. Bruce Smith.
- (2) A model under glass of an Indian Tea Garden by Messrs. G. Jackson & Sons, Ltd., 10 ft. by 9 ft.
- (3) A collective exhibit of tea samples.
- (4) Maps, diagrams, photographs, etc.

JUNGLE EXHIBITS

HIS MAJESTY THE KING'S TROPHIES.

MOUNTED HEADS.

| | | |
|-------------------|----|-----------------------------|
| 1 Rhinoceros | .. | <i>Rhinoceros unicornis</i> |
| 1 Shou | .. | <i>Cervus wallichi</i> |
| 1 Barasingha | .. | <i>Cervus cashmirensis</i> |
| 1 Markhor | .. | <i>Capra falconeri</i> |
| 1 Ibex | .. | <i>Capra sibirica</i> |
| 1 Tibetan argali | .. | <i>Ovis ammon</i> |
| 2 Ovis brookei | .. | |
| 1 Bharal | .. | <i>Ovis nahoar</i> |
| 1 Thar | .. | <i>Hemitragus jemlaicus</i> |
| 1 Goral | .. | <i>Urotragus goral</i> |
| 1 Tibetan gazelle | .. | <i>Gazella pecticaudata</i> |

INDIAN ELEPHANT TUSKS.

The largest in the world. See Rowland Ward's "Records of Big Game."

| | | |
|-------------------------|-------|----------------------------|
| Length on outside curve | | 8 ft. 9 ins.—8 ft. 6½ ins. |
| Greatest circumference | | 21½ ins. —22 ins. |
| Weight | | 161 lbs. —160 lbs. |

Trophies Lent and Shot by P. F. Hadow, Esq.—

MOUNTED HEADS.

| | | |
|------------------|----|--------------------------------|
| Markhor | .. | <i>Capra falconeri</i> |
| Yak | .. | <i>Peophagus grunniens</i> |
| Tibetan antelope | .. | <i>Pantholope hodgsoni</i> |
| Tibetan argali | .. | <i>Ovis hodgsoni</i> |
| Serow | .. | <i>Capricornis sumatrensis</i> |

Trophies Lent and Shot by P. B. Vander Byl, Esq.—

MOUNTED HEADS.

| | | |
|--------------|----|-----------------------------|
| Sambar | .. | <i>Cervus unicolor</i> |
| Chital | .. | <i>Cervus axis</i> |
| Nilgiri thar | .. | <i>Hemitragus hylocrius</i> |

SKULL AND HORNS.

| | | |
|------------|----|----------------------------|
| Barasingha | .. | <i>Cervus cashmirensis</i> |
|------------|----|----------------------------|

Trophy Lent and Shot by His Excellency The Viceroy of India—

One Indian Tiger skin, mounted as a mat, with modelled head.
Owner's field measurements 11 ft. 5 ins.

Trophy Lent and Shot by Victor Butler, Esq.—

One Indian Tiger skin, mounted as a mat, with modelled head.
(Kheri district.)
Owner's field measurements 10 ft. 6 ins.

Trophy Lent and Shot by Col. A. G. Arbuthnot—

One Leopard Skin, mounted as a mat, with modelled head.
Owner's field measurements 8 ft. 6 ins.

Trophy Lent and Shot by the Hon. G. Willoughby—

Sambar Head.
Length of longest horn 39 $\frac{3}{4}$ ins.

Trophies Lent by Rowland Ward, Ltd.—

MOUNTED HEADS.

| | |
|-----------------------|-----------------------------|
| Marco Polo's sheep .. | <i>Ovis poli</i> |
| Wild boar .. | <i>Sus cristatus</i> |
| Hog-deer .. | <i>Cervus porcinus</i> |
| Kiang .. | <i>Equus hemionus</i> |
| Crocodile .. | <i>Crocodilus palustris</i> |
| Do. (Gharial) .. | <i>Gavialis gangeticus</i> |
| Blackbuck .. | <i>Antilope cervicapra</i> |

HORNS ON SHIELDS.

| | |
|---|---------------------------|
| Gaur skull and horns .. | <i>Bibos gaurus</i> |
| 2 pairs Indian buffalo skulls and horns | <i>Babalus bubalis</i> |
| 2 pairs Takin frontals and horns | <i>Budorcas taxicolor</i> |
| Sambar frontal and horns | <i>Cervus unicolor</i> |
| Lion skull .. | <i>Felis leo</i> |

SKINS.

Indian Black Bear Skin, mounted as a mat, with modelled head.

Rowland Ward, Ltd., Jungle Exhibit, in Glass Case.

2 Tigers .. } Shot and lent by H.H. the Maharaja of Indore,
1 Leopard .. } Central India.

Gangetic Crocodile }
Cobra .. }
Peacock .. } Lent by Rowland Ward, Ltd.
Jungle fowl .. }

Meteorological Exhibit

- (1) A framed series of charts illustrating a storm in the Bay of Bengal (marked A).
- (2) A framed series of charts illustrating a storm in the Arabian Sea (marked B).
- (3) A framed series of charts and photographs illustrating flood warnings and flood damage (marked C).

The size of each of the frames A, B, C, will be about 6 $\frac{1}{4}$ ft. \times 1 $\frac{1}{4}$ ft.

- (4) Framed records of the great Japanese earthquake (marked D). The size of the frame will be 2 ft. 5 $\frac{1}{2}$ ins. broad \times 3 ft. 3 $\frac{1}{2}$ ins. long.
- (5) A framed notice giving information about the publications of the India Meteorological Dept. (marked E).
- (6) Meteorological Atlas of the Indian Seas.
- (7) Climatological Atlas of India.

BOMBAY MINT

| Denomination. | | | Specimen and Date. | |
|--|-----|----|----------------------|------------------------------------|
| British rupees | .. | .. | 1835 | King William IV. |
| Do. | .. | .. | 1840 | Victoria Queen. |
| Do. | .. | .. | 1862 | Victoria Queen. |
| Do. | .. | .. | 1877 | Victoria Empress. |
| Do. | .. | .. | 1903 | King Edward VII. |
| Do. | .. | .. | 1922 | King George V. |
| Bikanir rupee | .. | .. | | Victoria Empress. |
| British $\frac{1}{2}$ -rupee (silver) | .. | .. | 1897 | Victoria Empress. |
| Do. | do. | .. | 1907 | King Edward VII. |
| Do. | do. | .. | 1922 | King George V. |
| British $\frac{1}{4}$ -rupee (silver) | .. | .. | 1897 | Victoria Empress. |
| Do. | do. | .. | 1910 | King Edward VII. |
| Do. | do. | .. | 1917 | King George V. |
| British $\frac{1}{8}$ -rupee (silver) | .. | .. | 1901 | Victoria Empress. |
| Do. | do. | .. | 1910 | King Edward VII. |
| Do. | do. | .. | 1917 | King George V. |
| Nickel 8 annas | .. | .. | 1920 | King George V. |
| Nickel 4 annas | .. | .. | 1921 | King George V. |
| Nickel 2 annas | .. | .. | 1923 | King George V. |
| Nickel 1 anna | .. | .. | 1910 | King Edward VII. |
| Do. | .. | .. | 1923 | King George V. |
| Bronze pie | .. | .. | 1923 | King George V. |
| British dollars | .. | .. | 1904 | |
| Do. | .. | .. | 1921 | |
| Straits Settlements (silver coins) | .. | .. | Dollars | King George VII and King George V. |
| Do. | do. | .. | 50 cents. | King Edward VII and King George V. |
| Do. | do. | .. | 20 cents. | King Edward VII and King George V. |
| Do. | do. | .. | 10 cents. | King Edward VII and King George V. |
| Do. | do. | .. | 5 cents. | King Edward VII and King George V. |
| Nickel | .. | .. | (silver). | |
| Ceylon (silver coins) | .. | .. | 5 cents. | King George V. |
| Do. | do. | .. | 50 cents. | King George V. |
| Do. | do. | .. | 25 cents. | King George V. |
| Do. | do. | .. | 10 cents. | King George V. |
| Nickel | .. | .. | 5 cents. | King George V. |
| Portuguese India | .. | .. | Rupee | 1885 |
| Do. | .. | .. | $\frac{1}{2}$ -Rupee | 1885 |
| Do. | .. | .. | $\frac{1}{4}$ -Rupee | 1885 |
| Do. | .. | .. | $\frac{1}{8}$ -Rupee | 1881 |
| Egyptian | .. | .. | Gold | 100 piastres, 1916. |
| Do. | .. | .. | Silver | 20 do. 1917. |
| Do. | .. | .. | Do. | 10 do. 1917. |
| Do. | .. | .. | Do. | 5 do. 1917. |
| Do. | .. | .. | Do. | 2 do. 1917. |
| Do. | .. | .. | Nickel | 10 milliemes. |
| Do. | .. | .. | Do. | 5 do. |
| Do. | .. | .. | Do. | 2 do. |
| Do. | .. | .. | Do. | 1 do. |
| Gold coins | .. | .. | 1 Mohur | 1879 Victoria Empress. |
| Do. | .. | .. | 10 Rupees | 1879 Victoria Empress. |
| Do. | .. | .. | 5 Rupees | 1879 Victoria Empress. |
| Do. | .. | .. | 15 Rupee piece | 1918 |
| East African Protectorate (copper coins) | | | Pice | 1899 Victoria Empress. |

Also the following:—Three pieces of cupro-nickel scissel. One piece of silver scissel. Two Commemoration silver medals.

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1. 1854 I. G. S. Medal and 22 Clasps
2. 1908 Do. and 4 Clasps
3. Bengal Engineering College Medal
(O. & R.)
4. Tongsa Penlop Medal Do.
5. Govt. of India Horse Show Medal
(O. & R.)
6. Provincial Forest Service Medal
(O. & R.)
7. Governor's Medal, Bengal (O.)
8. Forest Ranger's Medal (O. & R.)
9. Lord Carmichael's Medal
(O. & R.)
10. A. T. M. Medal (Burma) Do.
11. Order of Merit, 1st class (Old type)
12. Do. do. (New type)
13. Do. 2nd Class.
14. Sardar Sahib (Title Badge).
15. Rao Sahib Do.
16. Rai Sahib Do.
17. Kaisar-i-Hind Gold, 1st Class.
18. Do. Silver, 2nd Class.
19. Khan Sahib (Title Badge).
20. Dewan Bahadur Do.
21. Order of British India, 1st Class.
22. Do. do. 2nd Class.
23. Sardar Bahadur ((Title Badge).
24. Khan Bahadur Do.
25. Rao Bahadur Do.
26. Rai Bahadur Do.
27. 1914 Star.
28. "Services Rendered" Badge.
29. Recruiting Badge.
30. War Work Badge.
31. 1914-15 Star.
32. MacGregor Memorial Medal
(O. & R.)
33. Army Sports Control Board
Dist. Medal (O.)
34. Photographic Society of India
Dist. Medal (O.)
35. A. S. C. B. India, Command Medal
(R.)
36. Heaton Memorial Medal
(B. E. College)
37. A. S. C. B. Colonel's Medal (R.)
38. Do. Governor's Do. Do.
39. Do. General's Do. Do.
40. Common Obverse of 37, 38 and 39.
41. 1895 I. G. S. Medal and 6 Clasps.
42. 1902 Do. and 1 Clasp.
43. Tibet Medal and 1 Clasp.
44. 1908 I. G. S. Medal and 1 Clasp.
45. Long Service and Good Conduct
Medal
46. Maternity and Child Welfare
Medal
1. Forbes Memorial Medal (O. & R.)
2. Ronaldshay Medical School Medal
(O. & R.)
3. King George's Medical College
(O. & R.)
4. North Point College, Darjeeling
(O. & R.)
5. College of Engineering, Vizaga-
patam (O. & R.)
6. Peace Day Celebration Cal. Exh.
(O. & R.)
7. Murshidabad Mohur (Str. Milled)
(O. & R.)
8. Do. do. (Oblique Milled)
(O. & R.)
9. Double Mohur 1835 (William IV)
(O. & R.)
10. Single Mohur 1870 (Victoria) Do.
11. Single Mohur 1835 (William IV)
(O. & R.)
12. Single Mohur 1841 (Victoria) Do.
13. Five Rupee piece (Victoria) Do.
14. Ten Rupee piece (Victoria) Do.
15. Murshidabad Rupee (Milled) Do.
16. 1835 $\frac{1}{4}$ Rupee Do.
17. Do. $\frac{1}{2}$ Do. Do.
18. Do. Rupee Do.
19. Murshidabad Rupee (no Milling)
(O. & R.)
20. 1841 $\frac{1}{8}$ Rupee, 2nd issue Do.
21. 1840 $\frac{1}{4}$ Do. do.
22. 1840 $\frac{1}{2}$ Do. do.
23. 1840 Rupee, 2nd issue do.
24. 1878 $\frac{1}{8}$ Rupee (Victoria Empress)
(O. & R.)
25. 1878 $\frac{1}{4}$ Do. do. do.
26. 1278 $\frac{1}{2}$ Do. do. do.
27. 1878 Rupee do. do.
28. 1910 $\frac{1}{8}$ Do. (Edward VII) do.
29. 1910 $\frac{1}{4}$ Do. do. do.
30. 1910 $\frac{1}{2}$ Do. do. do.
31. 1910 Rupee Do. do.
32. 1913 $\frac{1}{8}$ Do. (George V) do.
33. 1913 $\frac{1}{4}$ Do. do. do.
34. 1913 $\frac{1}{2}$ Do. do. do.

- | | |
|--|---|
| 35. 1913 Rupee (George V) (O. & R.) | 52. 1913 Bronze Pie Piece (George V) |
| 36. 1919 Nickel (rs.) do. do. | (O. & R.) |
| 37. 1919 Do. (2s.) do. do. | 53. 1913 Do. Half Pice do. do. |
| 38. 1919 Do. (4s.) do. do. | 54. 1913 Do. Single Pice do. do. |
| 39. 1919 Do. (8s.) do. do. | 55. Sports Medal, 2nd Man. Regt. (O.) |
| 40. 1890 Copper Pie Piece (Victoria E) | 56. 18th Div. (Mesopotamia) |
| (O. & R.) | Tournament Medal (O.) |
| 41. 1890 Copper $\frac{1}{2}$ Pice do. | 57. 1904 Ceylon $\frac{1}{4}$ cent. (O. & R.) |
| 42. 1890 Copper Single Pice do. | 58. 1904 Do. $\frac{1}{2}$ do. do. |
| 43. 1890 Copper Double Pice do. | 59. 1904 Do. 1 do. do. |
| 44. 1908 St. Settlements $\frac{1}{4}$ cent. do. | 60. Sports Medal, E. Yorks Regt. (O.) |
| 45. 1908 Do. $\frac{1}{2}$ do. do. | 61. Indo-Transvaal Shooting Medal |
| 46. 1920 Do. 1 do. do. | (O. & R.) |
| 47. 1920 Do. 5 do. do. | 62. La Martinière Collège Medal do. |
| 48. 1910 Bronze Pie Piece (Edw. VII) | 63. Food Products Exh. Medal (O.) |
| (O. & R.) | 64. Sir Edward Baker Do. |
| 49. 1910 Do. Half Pice do. do. | (O. & R.) |
| 50. 1910 Do. Single Pice do. do. | 65. Malaya Borneo Exh. Do. do. |
| 51. Sports Medal, Beds. & Herts Regt. | 66. Donkey Mare Medal do. |
| (O.) | |

"O" = Obverse.

"O" = Obverse.

"R" = Reverse.

"R" = Reverse.

PRESS ROOM

The Newspapers of India

In the Press Room visitors may see a number and variety of Indian newspapers. India has 85 different languages, hence the variety of the printed sheets of the many purely Indian papers that are exhibited in the Press Room. No one visitor can be expected to pick up the various publications with the hope of understanding every column he scans. The Indian Press Room nevertheless, with its publications printed in every variety of Eastern languages, may be the means of keeping visitors from India in touch with Home events thousands of miles away.

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Codes :

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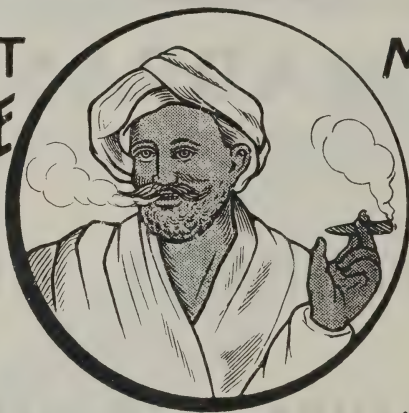
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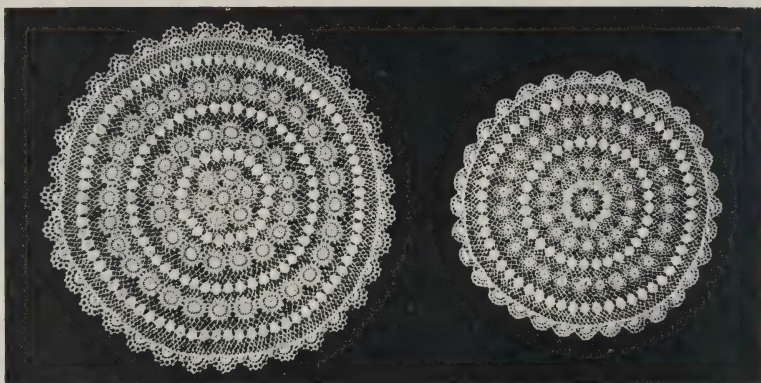
MR. C. G. ACHARYULU
(Prop. of the Manufacturing Co.)

IN the same stall where this artistic centrepiece is exhibited is also placed a specimen of the finest Indian Jewellery Art in the shape of Indian ladies' head ornaments called JADABILLAI and KONDABILLAI. Made of genuine flat diamonds, emeralds, and rubies set on gold gallery and finished off with 24 ct. gold leaf. Manufactured specially by us. Sample of gold leaf and the tools with which the articles were made are also on exhibition.

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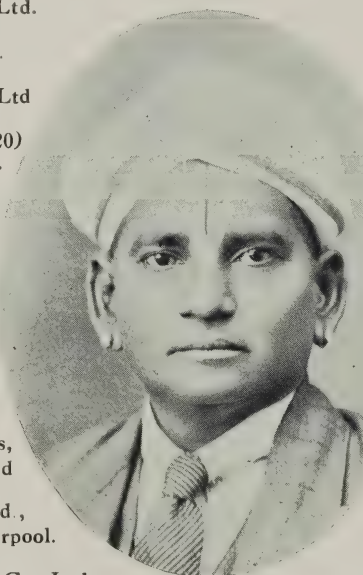
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MADRAS

The Madras Presidency which occupies the whole southern portion of the peninsula has an area of 141,075 square miles and a population of nearly 43 millions. Although it has a coast line of nearly 1,700 miles there is not a single natural harbour of any importance. In recent years the port of Madras has made considerable progress and there is a project for a new harbour at Vizagapatam. The principal industry of the Province is agriculture in which roughly 70% of the population is engaged. The chief crop is rice. The industrial crops are cotton, sugar, and ground nuts. Over 100,000 acres are under tea and coffee cultivation, the proportion being about half and half.

Under the head of foodstuffs, coriander and cashewnut, chillies and sugar, oil seed and preserved fish, cocotine and cereal food, condiments and chutnies, pepper and spices, tea and coffee, form the chief constituents of South Indian grocery. They give an idea not only of the kind of food which the people eat but also of what they grow and supply towards feeding the rest of the world. The land is also made to produce other materials than are directly necessary for sustenance such as rubber and fibre of different kinds.

In the matter of textile industries Madras Presidency occupies a prominent position among the Provinces of India. It has not only led the way in taking concerted action for resuscitating the ancient industries but has encouraged new ventures. It is unique in possessing a coir industry and has made more or less successful experiments in linking handloom industry with power plant for warp preparation. Cotton, silk, wool, coir, kora, aloe, jute and plantain fibre have all been brought into requisition and converted into cloths, rugs, carpets, blankets, mats, etc. Samples of such manufactured articles are exhibited side by side with the fibres used in the process. Among these are specially to be mentioned the textile fabrics which first attracted attention in Europe as particularly Indian, viz., the woollen carpets exported from Masulipatam and Cocanada and the South Indian coir rope and matting which were introduced in England through the Great Exhibition of 1851, which helped to give these articles a commercial value. South Indian yarns, both hand-made and machine-made, of various colours, are also exhibited. Textile industries are carried on in the Presidency on scales both small and large. The larger manufactures afford scope for enterprise, organisation, up-to-date equipment, skilful management, and kind treatment of workmen. In these respects Messrs. Binny & Co., of Madras, occupy a position second to none among the employers of labour in the whole of South India. No exhibition of South Indian textiles can, however, be considered complete which does not include the varieties of cotton and silk cloth dyed locally and woven by the hand for which Madura, Kumbakonam, Chicacole, Ponduru, Dharmavaram, Salem, Peddapur, Berhampore, Arni, Kollegal and Conjeevaram are famous. Specimens of these fabrics are all to be seen in the Madras Court—Conjeevaram sarees, Guntur lungies and rumals, check cloths and imitation tweeds from Cannanore, Madras handkerchiefs (which are neither handkerchiefs nor worn chiefly in Madras), to mention only a few.

In the assembling of exhibits, the Government departments engaged in the development of natural resources and the encouragement of industrial pursuits have also contributed their share. The Agricultural Department, which is co-operating with the United Planters' Association of Southern India in exhibiting agricultural produce will give illustrations of improved

methods of farming adopted by the people as the result of Government propaganda. Forest produce is exhibited not only in the natural state of unworked wood but also in the shape of furniture in the Madras Court in the making of which Madras timbers have been largely used. The exhibits of the Fisheries Department include varieties of fish canned at the Government Cannery, samples of oil and guano, fish meal, and model and diagrams showing improved methods of fishing, of fish curing, etc.

At the same time private enterprise has done a great deal to develop economic industries including art crafts as well as the natural resources of the Presidency, and the proportion of private exhibits to those of the Government is very considerable in the Madras Court.

The most important industry of the Madras Presidency before the war, as judged by the test of export trade, was tanning. Besides the materials used in the tanning process, the various grades of tanned hides and tanned goat skins which are exhibited along with specimens of finished leather turned out in the Chrome Leather Factory at Pallavaram, will give merchants visiting the Exhibition an idea of Madras skins and hides.

Madras is also rich in mineral ore. The finest magnesite in the world is to be found in Salem. Mica, which is found in several parts of India, is to be found in plates of sufficient size to be of commercial value in this Presidency. Ruby mica and kaolin are also exhibited. Other minerals of great potential value which invite working up are chrome ore, whose commercial value is great, barytes, the South Indian sources of which offer a wide field for working and steatite, for which there is a large demand in store. Emery used in polishing and slate are also among Madras exhibits. Samples of coal found in Madras are exhibited by a private firm.

A metal which though not of indigenous origin has yet gripped the metal manufacturers in South India is aluminium. Introduced nearly a quarter of a century ago by Sir Alfred Chatterton when he was in charge of the Madras School of Arts, it has taken its place in point of popularity and universality of use beside more ancient and longstanding media of metal ware in popular use. The aluminium exhibits are of particular value as showing the patterns and purposes of household vessels used by the South Indian people. Various other metals are of course also used, the chief of which are bell metal, much esteemed for its hygienic purity, copper, brass, iron and even silver and gold. And it is not only in making household utensils that all these metals are used. Bell metal, for instance, has been used in Cochin for making mirrors; the fused liquid metal is so thinly spread and the cooled sheet is so finely polished. Lamps, bells and tea sets in bell metal, silver and brass insects, so much appreciated by H.R.H. the Prince of Wales during his visit to Madras in 1922, engraving in silver, brass knives and weapons, and ironware of sorts—give an idea of the variety of the metal ware of the Presidency. Among other manufactures may be mentioned essential oils, scented incense sticks, soap and refined salt.

The Forest Section will serve to illustrate the immense possibilities of development in the trade in Madras woods and timber. Inquiry on the part of visitors to the Exhibition will, it is hoped, lead to investigation and utilisation of available supplies in South India. There is scope also for their greater utilisation in the country itself. More or less successful attempts have been made to use Forest materials in the making of matches, pencils and paper. South Indian wood is most attractively exhibited in the noble specimens of wood carving which have come from Cochin, Bellary and Ramnad. Wood

is, however, not the only material through which the artistic instincts of Indian hand craftsmen have found expression. Ivory, stone, metals and lac are also media of artistic expression and on pottery, jewellery, cotton prints, embroidery and lace work the artistic fingers of South Indian handicraft have left indelible marks of their subtle and inimitable skill.

EXHIBITS CLASSIFIED

Exhibits.

Exhibitors and their addresses.

I.—Raw Materials—

(1) FOODSTUFFS—

| | | | | |
|--------------|----|----|----|--|
| Rice | .. | .. | .. | } Agricultural Department of the Government of Madras. Cochin Government. |
| Paddy | .. | .. | .. | |
| Cereals | .. | .. | .. | |
| Pulses | .. | .. | .. | |
| Edible roots | .. | .. | .. | |
| Yams | .. | .. | .. | } Cochin Government. |
| Tapioca | .. | .. | .. | |
| Cocoanut | .. | .. | .. | Cochin Government |
| Coriander | .. | .. | .. | K. Lakshmiah Nayudu, Guntur. |
| Banana | .. | .. | .. | Cochin Government. |

(2) OIL SEEDS—

| | | | | |
|-------------|----|----|----|---|
| Groundnut | .. | .. | .. | } Agricultural Department of the Government of Madras. Best & Co., Post Box No. 63, Madras. |
| | | | | |
| Castor seed | .. | .. | .. | } Best & Co., Post Box No. 63, Madras. Seena Vana & Co., Tuticorin. Cochin Government. |
| | | | | |
| Kosangi | .. | .. | .. | } Jeypore Estate, Vizagapatam district. |
| Mohwa | .. | .. | .. | |
| Pongam | .. | .. | .. | |
| Mustard | .. | .. | .. | |
| Niger seed | .. | .. | .. | Seena Vana & Co., Tuticorin. |
| Linseed | .. | .. | .. | Kurnool Exhibition Committee. |
| Annato seed | .. | .. | .. | } Best & Co., Post Box No. 63, Madras. Seena Vana & Co., Tuticorin. J. Prioris, Yercaud, Salem. |
| | | | | |
| Safflower | .. | .. | .. | Bellary Exhibition Committee. |
| Sarapappu | .. | .. | .. | Do. do. |
| Gingelly | .. | .. | .. | } Agricultural Department of the Government of Madras. Cochin Government. |
| | | | | |

I.—Raw Materials—*contd.*

Exhibits.

Exhibitors and their addresses.

(3) FIBRES—

| | | | | |
|----------|----|----|----|--|
| Jute | .. | .. | .. | { The Buckingham and Carnatic Co. (Binny & Co.), Madras. South Indian Industrials, Ltd., Madras. |
| Palmyra | .. | .. | .. | Seena Vana & Co., Tuticorin. Ramnad collector. East India Produce Co., Cocanada. Agricultural Department of the Government of Madras. |
| Plantain | .. | .. | .. | Cochin Government. |
| Pulichai | .. | .. | .. | V. C. Vellingiri Gounder, M.L.C., Coimbatore. |
| Coir | .. | .. | .. | Sivaganga Estate, Ramnad district. Cochin Government. |
| Aloe | .. | .. | .. | Jail Department of the Government of Madras. Cochin Government. |
| Sunnhemp | .. | .. | .. | Agricultural Department of the Government of Madras. |

(4) PLANTING PRODUCTS—

| | | | | |
|----------------|----|----|----|--|
| Tea and coffee | .. | .. | .. | { The United Planters' Association of Southern India, Coimbatore (Agricultural Dept). The United Coffee Supply Co. (T. Stanes & Co.), Coimbatore. Agricultural Department of the Government of Madras. |
| Rubber | .. | .. | .. | The United Planters' Association of Southern India (Agricultural Department of the Government of Madras). Cochin Government. |

(5) SPICES—

| | | | | |
|-----------|----|----|----|--|
| Pepper | .. | .. | .. | { Agricultural Department of the Government of Madras. |
| Cardamoms | .. | .. | .. | { J. Prioris, Yercaud, Salem. |
| Cinnamon | .. | .. | .. | { Cochin Government. |
| Chillies | .. | .. | .. | { K. Lakshmiah Nayudu, Guntur. Agricultural Department of the Government of Madras. |
| Omum | .. | .. | .. | Kurnool Exhibition Committee. |
| Ginger | .. | .. | .. | Agricultural Department of the Government of Madras. |
| Do. dried | .. | .. | .. | Cochin Government. |
| Arecanut | .. | .. | .. | Do. |

II.—Food Industries—

| Exhibits. | Exhibitors and their addresses. |
|--------------------------------------|--|
| (1) PRESERVED FISH | Fisheries Dept. of the Government of Madras. |
| Salt fish pickle } | The Smith's Indian Condiment Company, St. Thomas' Mount. |
| Prawn pickle } | |
| (2) PRESERVED FRUITS | Vizianagaram Estate, Vizagapatam district. |
| | Industries Department of the Government of Madras. |
| | Cochin Government. |
| | V. Chellapillai, Chetty & Co., 6, Davidson Street, Madras. |
| | J. A. Sharwood & Co., London. |
| (3) JAGGERY AND SUGAR— | |
| Jaggery | Agricultural Department of the Government of Madras. |
| | Cochin Government. |
| Refined sugar | Babu Paramanand Sahu Mahasayo, Aska Sugar Works, Berhampore. |
| | Cochin Government. |
| Molasses | Babu Paramanand Sahu Mahasayo Aska Sugar Works, Berhampore. |
| (4) SWEETS | Pangal Sarvotham Naick, Mangalore, South Kanara. |
| (5) RICE | Pangal Sarvotham Naick, Mangalore, South Kanara. |
| | Cochin Government. |
| (6) PLANTAIN PRODUCTS | Cochin Government. |
| (7) EDIBLE OILS— | |
| Cocotine | Best & Co., Post Box No. 63, Madras. |
| Gingelly oil | Cochin Government. |
| Mustard | Jeypore Estate, Vizagapatam district. |
| | |
| Cocoanut oil | Agricultural Department of the Government of Madras. |
| | Cochin Government. |
| (8) COPRA | Cochin Government. |
| | The R.C.C. Baram's Indian Condiment Works, Royapettah, Madras. The Smith's Indian Condiment Company, St. Thomas' Mount. J. A. Sharwood & Co., Ltd., London. Best & Co., Madras. Ega Venkataakistnama Chetti & Sons, Condiment Manufacturers, 27, Cope Ven- katchala Ayyar Street, G. T., Madras. P. Mittulal Lallah, Nagappier Street, Thiruvatteswaranpet, Madras. H. Saville, "Staunton Lodge," 10, Church Road, Vepery. V. Chellapillai Chetty & Co., 6, Davidson Street, Madras. |
| (9) SOUTH INDIAN CONDIMENTS | |
| | |
| | |
| | |

II.—Food Industries—*contd.*

| Exhibits. | | Exhibitors and their addresses. | |
|------------------------|----|---------------------------------|---|
| (10) PAPPADAMS .. | .. | { | J. A. Sharwood & Co., Ltd., 10 Botolph Lane, Eastcheap, London, E.C.3 |
| | | | K. S. Dharma Raja Ayyar, 7, Pycroft's Road, Royapettah, Madras. |
| | | | V. Chellapillai Chetty & Co., 6, Davidson Street, Madras. |
| (11) JAMS & JELLIES .. | .. | { | Cochin Government. |
| | | | Industries Department of the Government of Madras. |
| (12) CEREAL FOOD .. | .. | | Panakale Rao & Co., Palacole. |

III.—Fishery Products—

| | | | | | |
|---------------------------------|----|---|-----|-----|-----|
| Fish curing | .. | Fisheries Department of the Government of Madras. | | | |
| Fishing methods and boats | .. | Do. | do. | do. | do. |
| Pearl fishing methods .. | .. | Do. | do. | do. | do. |
| Chank fishing methods .. | .. | Do. | do. | do. | do. |
| Chief edible fishes .. | .. | Do. | do. | do. | do. |

IV.—Textile Industries—

(1) COTTON—

A.—Yarns—

- | | | |
|---------------------------------------|----|---|
| (i) Mill made .. | .. | The Madras United Spinning and Weaving Mills Company, Ltd., Madras. |
| (ii) Handspun of different colours .. | .. | P. S. V. R. Swami & Co., Madura. |
| | .. | P. K. Ramaswami Ayyar & Bros., Madura. |

B.—FABRICS—

- | | | |
|--------------------------|----|---|
| (i) Mill made .. | .. | The Buckingham and Carnatic Co., Ltd., Madras. |
| | | The Madras United Spinning and Weaving Mills Co., Ltd., Madras. |
| | | Bommanna Somaraju & Karra Mallikarjanudu Uppada, Godavari St. |
| (ii) Handwoven— | | |
| (1) Bedsheets .. | .. | Bellary Exhibition Committee. |
| | | B. Bapayya Chetti, Vetapalam, Guntur district. |
| (2) Cloths .. | .. | Cochin Government. |
| | | Ramnad Collector. |
| | | Vizianagaram Samasthanam. |
| (3) Madras handkerchiefs | | A. Brunnschweiler & Co., Madras. |
| | | Cochin Government. |
| (4) Lungies and rumals. | | B. Bapayya Chetti, Vetapalam, Guntur district. |
| (5) Sarees .. | .. | A. K. Chengalvaroya Chetti, Merchant, Conjeeveram, Chingleput district. |
| | | Ramnad Collector. |
| (6) Towels .. | .. | Bellary Exhibition Committee. |
| | | Cochin Government & A. Perumal Pillai, Velipalayam, Negapatam. |
| (7) Muslins .. | .. | B. Sankara Sastriyar, Chicacole, Ganjam district. |
| | | Ramnad Collector. |

IV.—Textile Industries—*contd.*

| Exhibits. | Exhibitors and their addresses. |
|--|--|
| (8) Carpets .. | Bellary Exhibition Committee. Kurnool Exhibition Committee. Jail Department of the Government of Madras, V. Devaraja Pillai, Contractor, Bhavani, Coimbatore district. |
| (9) Cotton checks, imitation tus- sore, and imi- tation tweeds. | The Vishnu Weaving Works, Chowa, Cannanore. |
| (2) SILK— | |
| Cocoons (Tussur) .. | Jeypore Estate, Vizagapatam district. |
| Silk carpet | School of Arts and Crafts, Madras. G. M. Gurusami Chetty, Silk Merchant, Ammapet, Salem. Venkatagiri Estate. R. G. Varathier, Merchant, Kumbakonam, Tanjore district. T. V. Krishna Ayyar, Merchant, Kumbakonam, Tanjore district. Rani Renga Ayyar & Sons, Merchants, Kumbakonam, Tajore district. A. Danadeva Nainar & Son, Merchants, Arni, North Arcot district. V. Ramaswami Nayudu, Cloth Merchant, Mayavaram, Tanjore district. Murari Varathier, Merchant, Salem. Vizianagram Estate. Ramabhadra Reddi of Siruvanthadu, Villupuram, South Arcot district. Bellary Exhibition Committee. Muppanna Somaraju & Bros., Peddapur, Godavari district. Salem Exhibition Committee. Duggu Ramanna, Merchant, Dharmaveram, Anantapur district. Onte Rengaswami, Merchant, Kollegal, Coimbatore district. Nallasivayya, Silk Cloth Merchant, Berhampur, Ganjam district & Venkatagiri Estate. M. V. Ramaswami Chetti, Merchant, Conjeeveram, Chingleput district. P. S. Kandaswami Sa, Merchant, Conjeeveram, Chingleput district. A. Peddu Chetti, Merchant, Conjeeveram, Chingleput district. V. K. Krishnappa Chettiar, Merchant, Conjeeveram, Chingleput district. S. S. Krishna Sa, Merchant, Conjeeveram, Chingleput district. Nallasivayya, Silk Cloth Merchant, Berhampur, Ganjam district. Murari Varathier, Merchant, Salem. Bellary Exhibition Committee. |
| Silk sarees | |
| Silk cloths | |

IV.—Textile Industries—*contd.*

| Exhibitors. | Exhibitors and their addresses. | | |
|--|---------------------------------|--|---|
| Silk cloths— <i>contd.</i> | | | Duggu Ramanna, Merchant, Dharmavaram, Anantapur district. Muppanna Somarazu & Bros., Peddapur, Godavari district. Trichinopoly Exhibition Committee. Ramnad Collector. Jeypore Estate Vizagapatam district. G. M. Gurusamy Chetty, Merchant, Ammapet, Salem. |
| Bodices | | | Bellary Exhibition Committee. |
| Napkins | | | Onte Rengaswami, Merchant, Kollegal, Coimbatore district. |
| Diamond silk | | | R. Ramalingam, Kandukur, Nellore district. |
| Silk rumals | | | Murari Varathier, Merchant, Salem. Trichinopoly Exhibition Committee. S. S. Krishna Sa of Conjeeveram, Chingleput district. Muppanna Somarazu & Bros., Peddapur, Godavari district. |
| Ladies gown, curtain and a table cloth in silk containing inscriptions in gold thread. | | | Rao Sahib K. V. Ramachari, M.L.C., Madura. |
| Silk Table cloth | | | T. A. Muttuswami Aiyar, Lace and Silk Merchant, Shevapet, Salem. |
| Silk kerchiefs | | | S. S. Krishna Sa & Sons, Cloth Merchants, Conjeeveram. The Bellary Exhibition Committee. |
| (3) WOOL— | | | |
| Carpets | | | Ismail Hajee Abdulla, Merchant, Ellore, Kistna district. Jail Department of the Government of Madras. Best & Co., Madras. School of Arts and Crafts, Madras. Nawab of Banganapalle. |
| Handknit stockings | | | |
| (4) JUTE— | | | |
| Yarn and fabrics | | | The Buckingham and Carnatic Co., Ltd. Madras. South India Industrials, Ltd., Madras. |
| (5) GRASS MATS— | | | |
| Kora (sedge) | | | S. David Nadar, Revenue Divl. Officer, Salem. Forest Dept. of the Government of Madras. Cochin Government. Industries Department of the Government of Madras. |
| Aloe | | | Jail Dept. of the Government of Madras. |
| Palm | | | Sivaganga Estate, Ramnad district. |
| (6) COIR— | | | |
| Yarn, mats and matting | | | Cochin Government Peirce, Leslie & Co., Calicut. Jail Department of the Government of Madras. |
| Brushes | | | Cochin Government. |

V.—Leather Industries.

| Exhibits. | Exhibitors and their addresses. |
|---|--|
| (1) HALF - FINISHED & FINISHED SKINS & LEATHERS | The Chrome Leather Co., Chromepet, near Madras. M. Jamal Moideen Saib & Co., 16, Thambu Chetty Street, Georgetown, Madras. Industries Dept. of the Government of Madras. Best & Co., Post Box No. 63, Madras. Bellary Exhibition Committee Cochin Government. |
| (2) LEATHER GOODS OF ALL DESCRIPTIONS | The Chrome Leather Co., Chromepet, near Madras. The Nawab of Banganapalle. The Collector of Kistna. Alex. Hussam & Co., 6, Stringer's Street, Georgetown, Madras. |

VI.—Ores and Metals.

| | |
|-------------------------|--|
| (1) MINERALS— | |
| Barytes | Kurnool Exhibition Committee. |
| Steatite | Do. do. |
| Mica | Venkatagiri Estate, Nellore district. |
| Mica—Ruby | C.W. Schomburg, "Retreat," Kilpauk, Madras. |
| Mica—Ruby—Wynaad | A. H. Gaston, Dent's Gardens, Cathedral Post Office, Madras. |
| —Sickle cut and dressed | |
| Mica—Black | Jeypore Estate, Vizagapatam district. |
| Emery | E. K. Dickens, Hastampatti, Salem district. |
| Magnesite | The Magnesite Syndicate, Ltd., Suramangalam, Salem district. |
| Coal | Best & Co., Post Box No. 63, Madras. |
| Slate | Venkatagiri Estate, Nellore district. Kurnool Exhibition Committee. |
| Crystalline Marble .. | } Vizianagaram Estate. |
| Crystals of Apatite .. | |
| Zircon and Magnetite.. | |
| Kaolin and Red Ochre } | |
| Copper ore | C. W. Schomburg, "Retreat," Kilpauk, Madras. |
| Chrome ore | Do. do. do. |
| Monozite | Do. do. do. |
| Baryta | Do. do. do. |
| Asbestos.. .. | C.W. Schomburg, "Retreat," Kilpauk, Madras. B. Chinna Malla Reddi, Kondapuram, Cuddapah district. |
| Iron | Jeypore Estate, Vizagapatam district. Best & Co., Post Box No. 63, Madras. |
| Kyanite | Do. do. do. |
| Garnet rock | Do. do. do. |
| Garnets | Do. do. do. |
| Corundum | Do. do. do. |
| Do. ruby | C. W. Schomburg, "Retreat," Kilpauk, Madras. |
| (2) Manufactures— | |
| Bell-metal | M.A.R.N. Metal Factory, Kalahasti, Chittoor district. Cochin Government. |

VI.—Ores and Metals—*contd.*

| Exhibits. | Exhibitors and their addresses. |
|-----------------------|---|
| Aluminium | The Indian Aluminium Co., 32, Triplicane High Road, Madras. |
| Mica | Venkatagiri Estate, Nellore district. |
| Brass—including locks | Sivaganga Estate, Ramnad district. |
| | K. Veerappa Asari, Cocanada. |
| Ironware— | Best & Co., Post Box No. 63, Madras. |
| Malabar axe | Forest Dept. of the Government of Madras. |
| Mopla war knife .. | E. F. Thomas, C.I.E., I.C.S., Madras. |
| Tangies | Jeypore Estate, Vizagapatam district. |

VII.—Oils, Soap, Paint and Perfumes.

- (1) ESSENTIAL OILS & PERFUMES J. Prioris, Yercaud, Salem.
Cochin Government.
- (2) SCENTED INCENSE STICKS OF VARIETIES T. A. Rahiman & Sons, China Bazaar Road, Madras.
G. H. Jackson, I.C.S., Guntur.
- (3) INDUSTRIAL OILS—

| | |
|------------------|--|
| Fish oil | Fisheries Dept. of the Government of Madras. |
| Groundnut oil .. | Best & Co., Post Box No. 63, Madras. |
| Castor oil | Do. do. do. |

 Cochin Government.

VIII.—Chemical Industries.

- (1) SALT—

| | |
|-------------------------|--|
| Ordinary and refined .. | Seena Vana & Co., Tuticorin. |
| | R. R. A. Court Beadon, Government Victoria Hospital, Madras. |
| | The Schomtir Salt Co., 17, Purasawakam High Road, Madras. |
- (2) ARRACK—

| | |
|---------------|---------------------------------------|
| Mohwa | Jeypore Estate, Vizagapatam district. |
| Cocanut | Cochin Government. |
- (3) FERTILISERS—

| | |
|-----------------------|--|
| Phosphatic nodules .. | Agricultural Department of the Government of Madras. |
| Fish guano | Fisheries Department of the Government of Madras. |

IX.—Wood, Timber and Forest Products.

- (1) TIMBER SPECIMENS—

| | |
|----------------------------------|--|
| Sandal wood | Sivaganga Estate, Ramnad district. |
| | Sandur Estate. |
| Sandal specimens .. | Forest Dept. of the Government of Madras. |
| East Coast timbers .. | Jeypore Estate, Vizagapatam district. |
| Malabar timbers .. | Cochin Government. |
| Furniture made of Madras timbers | Forest Department of the Government of Madras. |
- (2) PENCILS The Madras Pencil Factory—Managing Agents, V. Perumal Chetty & Sons, Stringer's Street, Georgetown, Madras.
- (3) TANNING MATERIALS Jeypore Estate, Vizagapatam district.
Seena Vana & Co., Tuticorin.
V. C. Vellingiri Gounder, M.L.C., Coimbatore.
Bellary Exhibition Committee.

IX.—Wood, Timber and Forest Products—*contd.*

- | Exhibits. | Exhibitors and their addresses. |
|--------------------------------------|--|
| (3) Tanning Materials— <i>contd.</i> | Best & Co., Post Box No. 63, Madras. Industries Dept. of the Government of Madras. |
| (4) DRUGS AND MEDICINES | The Madras Ayurvedic Pharmacy, Ltd., Govindappa Naick Street, Georgetown, Madras. Cochin Government. Jeypore Estate, Vizagapatam district. Cinchona Dept. of the Government of Madras. |
| (5) DYEING MATERIALS— | |
| Indigo | G. R. Krishnaswami Chetti & Co., Post Box No. 411, No. 3 Causee Chetti Street, Georgetown, Madras. B. Bapayya Chetti, Vetapalam, Guntur district. |
| Gallnut | Bellary Exhibition Committee. |
| Turmeric | K. Lakshmiah Nayudu, Guntur. Agricultural Department of the Government of Madras. Cochin Government. Seena Vana & Co., Tuticorin. |
| Other dyeing materials | Best & Co., Post Box No. 63, Madras. Jeypore Estate, Vizagapatam, district. |
| Honey & Beeswax .. | Cochin Government. Jeypore Estate |
| (7) OTHER MINOR FOREST PRODUCTS | Jeypore Estate, Vizagapatam district. Cochin Government. Bellary Exhibition Committee. |

X.—Arts Industries.

(1) FURNITURE AND

CARVING—

- | | |
|---|---|
| Carved temple (rosewood) | Syed Kamruddin Sahib, Town Hall Road, Madura. |
| Do. table | Bellary Exhibition Committee. |
| Do. door frames and doors | Ramnad Collector. |
| Carved Tables—Square, oval, octagonal, round, ivory inlaid, rosewood, ebony, teak, dressing, washing, tea, hall | K. Sankaranarayana Asari, c/o A. and F. Harvey, Virudupatti, Ramnad district. Ramnad Collector. School of Arts and Crafts, Madras. Cochin Government. Industries Dept. of the Government of Madras. |
| Carved teapoy of different designs— | |
| Rosewood | Jail Department of the Government of Madras. Cochin Government. |
| Kunnivaka | Cochin Government. |
| Teak | Do. |
| Carved sofa | K. Sankaranarayana Asari, c/o A. and F. Harvey, Virudupatti, Ramnad district. |
| Do. bench | Cochin Government. |
| Settee of carved rosewood | School of Arts and Crafts, Madras. |
| Chairs— | |
| Green and gold lacquer | School of Arts and Crafts, Madras. |
| Black and gold lacquer | Do. do. |

X.—Arts Industries—*contd.*

| Exhibits. | Exhibitors and their addresses. | | |
|---------------------------|--|--|-----|
| Carved chairs— | | | |
| Ebony | } | K. Sankaranarayana Asari, c/o A. and F. | |
| Rosewood | | Harvey, Virudupatti, Ramnad district. | |
| Gilded with arms repre- | | School of Arts and Crafts, Madras. | |
| sented lions | | Cochin Government. | |
| Revolving | } | Jail Department of the Government of Madras. | |
| Armless | | Best & Co., Ltd., Post Box No. 63, Madras. | |
| Carved dinner gong be- | K. Sankaranarayana Asari, c/o A. and F. | | |
| tween elephant figures | Harvey, Virudupatti, Ramnad district. | | |
| Carved dinner gong be- | Do. | do. | do. |
| tween human figures | | | |
| Carved cigarette box in | Do. | do. | do. |
| sandal wood | | | |
| Carved cigarette box in | Do. | do. | do. |
| rosewood | | | |
| Carved cigar case .. | Do. | do. | do. |
| Carved lampstand .. | Do. | do. | do. |
| Carved flowerpot .. | Do. | do. | do. |
| Carved tea trays .. | Cochin Government. | | |
| | K. Sankaranarayana Asari, c/o A. and F. | | |
| | Harvey, Virudupatti, Ramnad district. | | |
| Carved trays | Ramnad Collector. | | |
| Carved wall brackets .. | Cochin Government. | | |
| | K. Sankaranarayana Asari, c/o A. and F. | | |
| | Harvey, Virudupatti, Ramnad district. | | |
| | Ramnad Collector. | | |
| Carved dressing mirror. | School of Arts and Crafts, Madras. | | |
| (Black & gold lacquer) | | | |
| Carved hanging wall | Do. | do. | |
| cabinet. (Black & gold | | | |
| lacquer). | | | |
| Hanging wall cabinet | Cochin Government. | | |
| (plain) | | | |
| Furniture and other arti- | Agricultural Department of the Government | | |
| cles made of cocoanut | of Madras. | | |
| and palmyra wood | Cochin Government. | | |
| Carved boxes— | | | |
| Teakwood and ebony | School of Arts and Crafts, Madras. | | |
| inlaid with ivory | | | |
| Lined with red cedar .. | Jail Department of the Government of Madras. | | |
| Lined with red cedar, | Do. | do. | do. |
| silver mounted | | | |
| Sandalwood boxes .. | Cochin Government. | | |
| Sandalwood with inner | Rajah of Kalahasti, Chittoor district. | | |
| compartments | | | |
| Carved picture frames in | Cochin Government. | | |
| palmyra | | | |
| Miniature teak raft .. | Forest Dept. of the Government of Madras. | | |
| Embroidery frame .. | The Standard Furniture Co., Kallai, Calicut, | | |
| | Malabar. | | |
| Miniature temple car .. | Sivaganga Estate, Ramnad district. | | |
| Carved swing on ele- | Cochin Government. | | |
| phants with ivory nails | | | |

X.—Arts Industries—*contd.*

| Exhibits. | Exhibitors and their addresses. | | |
|---|--|-----|-----|
| Carved sandalwood fan | Rajah of Kalahasti, Chittoor district. | | |
| Roll top desk | Cochin Government. | | |
| Revolving chair | Do. | | |
| Footstool | Do. | | |
| Cabinet | Do. | | |
| Table with and without drawers | Do. | | |
| Armchair | Do. | | |
| Armless chair | Do. | | |
| Revolving book case .. | Do. | | |
| Revolving show case .. | Do. | | |
| Screens | Do. | | |
| Bath tub | Do. | | |
| Cupboard | Do. | | |
| Cocoanut shell carving— | | | |
| Carved spirit case, mounted on three dragons with rosewood pedestal | Jail Department of the Government of Madras. | | |
| Carved cruet set, silver lined, and with silver spoons | Do. | do. | do. |
| Carved flower bowl, mounted on three elephants | Do. | do. | do. |
| Carved napkin rings .. | Do. | do. | do. |
| Carved gipsy tripods .. | Do. | do. | do. |
| Miscellaneous | Cochin Government. | | |
| | Rajah of Kalahasti, Chittoor district. | | |

(2) TOYS AND PITH WORKS—

| | |
|--------------------------------|--|
| Pith turbans | C. Muhammad Ghouse and Sons, Govindappa Naick Street, Georgetown, Madras. |
| Coronet | The Third Rajah of Calicut, Malabar. |
| Kondapalle toys | The Collector of Kistna. |
| Kampli toys | Bellary Exhibition Committee. |
| Pondicherry toys | Rajah of Kalahasti, Chittoor district, and A. Sambasiva Pathar, Pondicherry. |
| Models of South Indian Temples | Trichinopoly Exhibition Committee. |
| Church view | Do. do. |
| St. Joseph's College view | Do. do. |
| Temple car | Do. do. |
| Double bullock cart, etc. | Do. do. |

(3) COTTON PRINTS—

| | |
|----------------------|--|
| Gollapalam | Pindiprolu Ramamurti Pantulu and Gadi Reddi Subrahmanyam Nayudu, Gollapalam Godavari district. |
| Kodalikaruppur | Trichinopoly Exhibition Committee. |
| | School of Arts and Crafts, Madras. |
| Kalahasti | The Mahant of Tirupati, Chittoor district. |
| | School of Arts and Crafts, Madras. |

X.—Arts Industries—*contd.*

| Exhibits. | Exhibitors and their addresses. |
|--|--|
| Masulipatam | Vadlamudi Varadarajulu Nayudu, Masulipatam, Kistna district. |
| | Vinnakota Chinna Ramiah and Vinnakota Venkataswami Nayudu, Masulipatam, Kistna district. |
| Vaniyambadi | Rao Bahadur K. Krishnaswami Nayudu, M.L.C., Vellore, North Arcot district. |
| Cotton with gold border | School of Arts and Crafts, Madras. |
| (4) SILVER AND GOLD WORK— | |
| Gold and silver strings | N. V. Singariah, Vizianagaram, Vizagapatam district. |
| Silver inlaid work— | |
| Plate (bell-metal) .. | Rajah of Kalahasti, Chittoor district. |
| Silver vessel (chembu) on stand, with Dasavatharam of Maha Vishnu engraved | Jail Department of the Government of Madras. |
| Silver plate stand fixed with an embossed medal | P. Sundaram & Sons, Coimbatore. |
| Cup with Krishna image | Trichinopoly Exhibition Committee. |
| Do. animal | Do. Do. |
| Flower stands | Do. do. |
| Betelnut case | Do. do. |
| Betel case | Do. do. |
| Rosewater sprinkler .. | Do. do. |
| One set of deity images | Do. do. |
| Saffron powder case .. | Do. do. |
| Camphor burning spoon | Do. do. |
| Tub | Do. do. |
| Tea jugs | Do. do. |
| Tea cup | Do. do. |
| Tumbler | Do. do. |
| Horse | Do. do. |
| Cow | Do. do. |
| Bowl with cover .. | School of Arts and Crafts, Madras. |
| Sandal paste cups .. | Do. do. |
| Lamp | Do. do. |
| Chunam box | Do. do. |
| Chembu | Do. do. |
| Box | Do. do. |
| Bowl | Do. do. |
| Wine vessel | Do. do. |
| Anklets | Do. do. |
| Wine cup | Do. do. |
| Coffee pot | Do. do. |
| Milk jug | Do. do. |
| Silver images and Durbar hall | Vizianagaram Estate. |
| Silver and brass work— | |
| Brass ball with an oil lamp inside | Rao Sahib Kone Gopaludu Garu, Ellore, Kistna district. |
| Brass box with Seshanarayanan | Do. do. do. |

X.—Arts Industries—*contd.*

| Exhibits. | Exhibitors and their addresses. |
|--|---|
| Ganjam brass and silver fishes | Chinnam Raghunatha Patro of Belligunta, Ganjam district. |
| Silver insects and images | Ramnad Collector. |
| Old brass articles .. | Trichinopoly Exhibition Committee. |
| Cocoanut shell carving inlaid with silver and brass work | Malabar Exhibition Committee. |
| Brass centre piece electro-plated in silver, gold, and a portion oxidised. | C. C. Acharyulu & Sons, Park Town, Madras. |
| Metallic wings | Sivaganga Estate, Ramnad district. |
| Flower pot in brass .. | Do. do. |
| Lion in brass | Do. do. |
| Tiger do. | Do. do. |
| Deer do. | Do. do. |
| Cobra do. | Do. do. |
| Buffalo do. | Do. do. |
| Horse do. | Do. do. |
| Bee do. | Do. do. |
| Camel do. | Do. do. |
| Carrying basket in brass | Do. do. |
| Cow in brass | Do. do. |
| Tumblers in brass .. | Do. do. |
| Lamp in brass | Do. do. |
| Brass water pot .. | School of Arts and Crafts, Madras. |
| Do. trays | Do. do. |
| Bronze work— | |
| Oil lamps | Trichinopoly Exhibition Committee. |
| Betel and spice case .. | Do. do. |
| Box | Do. do. |
| Chain for light | Do. do. |
| Horse | Do. do. |
| Bell metal work— | |
| Looking glass made of bell metal | Cochin Government. |
| Toys and fancy articles | The M. A. R. N. Metal Factory, Kalahasti. |
| (5) IVORY WORKS— | |
| Images and toys .. | Cochin Government, and Mr. R. M. Krishnaswami, Chetty, Brass Merchant, Tangore. |
| Box (watch case) .. | Rajah of Kalahasti, Chittoor district. |
| Looking glass mounted on tusks | School of Arts and Crafts, Madras. |
| Looking glass in ivory work frame | Rajah of Kalahasti, Chittoor district. |
| Miscellaneous | Cochin Government. |
| (6) BRONZE AND BRASS IMAGES— | |
| Of all kinds | Ramnad Collector. |
| | Trichinopoly Exhibition Committee. |
| Copper images | M. A. K. Madhanna Chettiar, Tirupur, and A. K. Poncevalan, Chettiar, Tirupur. |

X.—Arts Industries—*contd.*

Exhibits.

Exhibitors and their addresses.

(7) ART POTTERY—

| | |
|------------------------|------------------------------------|
| Feather weight pottery | Bellary Exhibition Committee. |
| Earthen images .. | Do. do. |
| Vases | Sivaganga Estate, Ramnad district. |
| Milk jug | Do. do. |
| Tea pots.. .. | Do. do. |
| Bottle | Do. do. |
| Rose bowl | Do. do. |
| Jar | Do. do. |
| Ink bottle | Do. do. |
| Clay statuettes | A. Sambasiva Pathar, Pondicherry. |

(8) JEWELLERY—

Diwan Bahadur T. Namberumal Chetty Garu,
Merchant, Madras.
C. C. Acharyulu & Sons, Park Town, Madras.

(9) LACQUER WORK—

| | |
|----------------------|---|
| Trays | } Jeypore Estate, Vizagapatam district. Vizianagaram Estate, Vizagapatam district. Nawab of Banganapalle. Cochin Government. |
| Fans | |
| Garlands | |
| Chamarams | |
| Boxes | |
| Walking sticks | |
| Pens | |
| Other kinds | |

(10) Sandalwood carvings .. }
Buffalo horn carvings .. } Cochin Government.

(11) Ornaments made of The Fisheries Department of the Government
chank shells of Madras.

XI.—Building and Engineering Trades.

(1) MACHINERY—

| | |
|---------------------------------|-----------------------------|
| Motor cylinders .. | Geo. Brunton & Son, Cochin. |
| Match box making machinery | Do. do. |
| Specimens of foundry work | Binny & Co., Madras. |

(2) STONEWARE AND EARTHENWARE—

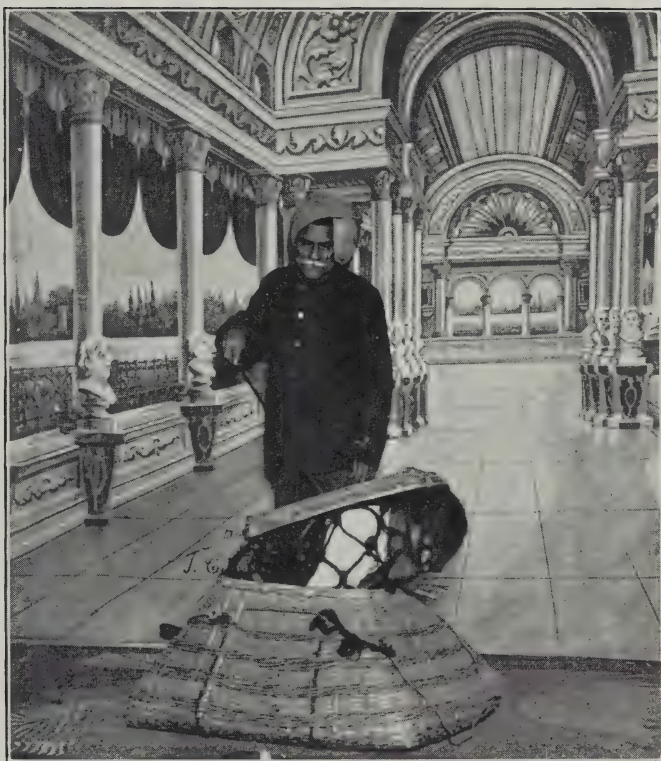
| | |
|---|------------------------------------|
| Dasavatharams.. .. | Trichinopoly Exhibition Committee. |
| Stone images | Ramnad Collector. |
| Hanuman | Bellary Exhibition Committee. |
| Glazed earthenware of Karigeri | North Arcot Exhibition Committee. |
| Shirt buttons and links, with silver joints | G. H. Jackson, I.C.S., Guntur. |
| Chessmen | Do. do. |
| Fancy little boxes in stone | Do. do. |



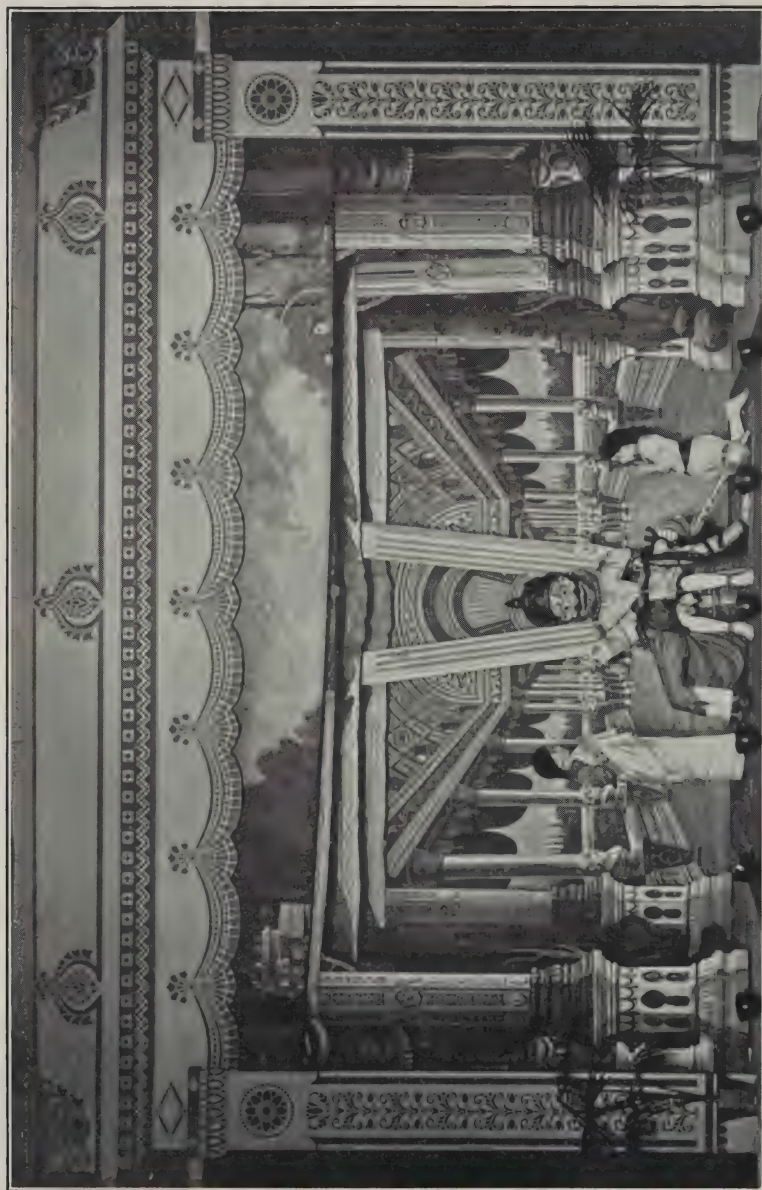
Office of the Madras Court.
Note that this is a specimen of Dravidian architecture.



Carved Mantapam—Madura Temple.



The Juggler imprisoning his assistant in a basket.



The Angry God bursting out of the pillar to indicate His Omnipresence.

XII.—Village and Mission Industries.

| Exhibits. | Exhibitors and their addresses. | | |
|---|--|-----|--|
| Lace and Chikan work of all kinds— | <div>Jeypore Estate. Jonah & Joseph, Narasapur, Kistna district. The Delta Exporting and Importing Co., Palacole, Kistna district. Solasa Venkatramiah, Palacole, Kistna district. Rev. M. Simon, Narasapur, Kistna district K. Mathews & Sons, Narasapur, Kistna district. Industries Dept. of the Government of Madras. Nawab of Banganapalle. Cochin Government. Binny & Co., Madras.</div> | | |
| Crochet | | | |
| Filet | | | |
| Pillow | | | |
| Embroidery— | | | |
| European designs .. | Industries Department of the Government of Madras. | | |
| Madras embroidery .. | Miss Behroza Sohrab Tarapore, 45, Main Road, Rayapuram, Madras. | | |
| Fancy baskets and other miscellaneous work— | | | |
| Pulicat baskets .. | Industries Department of the Government of Madras. | | |
| Baskets | Sivaganga Estate, Ramnad district. | | |
| Brief bags | Cochin Government. | | |
| Trays | Do. | | |
| Waste paper basket .. | Do. | | |
| Other baskets of rattan grass, etc. | Do. | | |
| Flower baskets and betel-leaf boxes | Ramnad Collector. | | |
| Needlework | Sandur Estate. | | |
| Teapoy cover in beadwork | Cochin Government.. | | |
| Rice grains with inscriptions | Nawab of Banganapalle. | | |
| Chair, miniature, made of paddy | Jeypore Estate, Vizagapatam district. | | |
| Tray do. | Do. | do. | |
| Fans do. | Do. | do. | |
| Measure do. | Do. | do. | |
| Malabar hats | Cochin Government and Forest Department of the Government of Madras. | | |
| Bottle with curious inscriptions | Rajah of Kalahasti, Chittoor district. | | |
| Hill people's hats .. | Jeypore Estate, Vizagapatam district. | | |

XIII.—Statistical.

| Exhibits. | Exhibitors and their addresses. |
|--|--|
| Inlaid Map of the Madras Presidency. | Forest Department of the Government of Madras. |
| Map of the Cochin State | Cochin Government. |
| Model of Madras Harbour. | Port Trust, Madras. |
| Model of Cochin Harbour | Marine Department of the Government of Madras. |
| Model of Tuticorin Harbour. | Do. do. do. do. |
| Models of agricultural operations. | Agricultural Department of the Government of Madras. |
| Models of fishing .. | Fisheries Department of the Government of Madras. |
| Models of boats .. | Do. do. do. do. |
| Models of nets | Do. do. do. do. |
| Models of canoes .. | Do. do. do. do. |
| Models of catamaran, etc. | Do. do. do. do. |
| Model of a Post and Telegraph Office. | Nawab of Banganapalle. |
| Models of huts of Hill tribes. | Forest Department of the Government of Madras. |
| Models of elephant capturing operations. | Do. do. do. do. |
| Model of Cantelever-bridge. | Do. do. do. do. |
| Models of rest houses .. | Do. do. do. do. |
| Model of Toda temple.. | Do. do. do. do. |
| Model of Toda hut .. | Do. do. do. do. |
| Model of a Malabar house. | Cochin Government. |
| Model of a Malabar temple. | Do. do. |

XIV.—Miscellaneous.

| | |
|---|--|
| Sword with golden bands at the ends with ivory handle. | Rajah of Kalahasti, Chittoor district. |
| Knife with a handle set with imitation gems and green stones. | Do. do. do. |
| Knives | Forest Department of the Government of Madras. |
| Weapons | Sivaganga Estate, Ramnad district. |
| Buffalo horns and tips.. | The East India Produce Co., Cocanada, Godavari district. |
| Ivory and horns of wild animals. | Cochin Government. |
| Cigars and Cheroots .. | Best & Co., Post Box No. 63, Madras. |
| | Spencer & Co., Mount Road, Madras. |
| | D'Cruz & Co., Cocanada. |

XIV.—Miscellaneous—*contd.*

| Exhibits. | Exhibitors and their addresses. |
|---|---|
| Drawing on egg shells.. | Jeypore Estate, Vizagapatam district. |
| Book of beads | Do. do. do. |
| Hillmen's dress and ornaments. | Do. do. do. |
| Circles formed by straight lines. | Do. do. do. |
| Smoking mixtures .. | Best & Co., Post Box No. 63, Madras. |
| Tobacco | Do. do. do. |
| | K. Lakshmiah Nayudu, Guntur. |
| | Agricultural Department of the Government of Madras. |
| Scented snuff | A. S. Muhammad Shamsuddin Saib, Post Box No. 1201, Madras. |
| Attar beads— | |
| Necklets | T. A. Rahiman & Sons, China Bazaar Road, Madras. |
| Garland | Do. do. do. do. |
| Watch chains | Do. do. do. do. |
| Neck chains | Do. do. do. do. |
| Sporting materials— | |
| Hockey sticks | Narsoji Bros., The Crown Sports House, Bellary. |
| Tennis racket | Do. do. do. do. |
| Badminton racket .. | Do. do. do. do. |
| Tennis gut | Do. do. do. do. |
| Pebbles for spectacles.. | R. M. Krishnaswami, Chetti, Tanjore. |
| Rice grains with inscriptions on them | Nawab of Banganpalli. |
| Album of Cochin, Travancore and Hyderabad stamps. | Cochin Government. |
| Agricultural implements | Do. do. |
| Venchamara, one pair | Do. do. |
| Buffalo horn elephants.. | Do. do. |
| Fancy articles made of horn. | Do. do. |
| Playing cards | Trichinopoly Exhibition Committee. |
| Miniature tents | Jail Department of the Government of Madras. |
| Publications— | |
| Madras Mail Annual .. | "The Madras Mail," Mount Road, Madras. |
| "Oriental Music in European Notation" by A. M. Chinnaswami Modattiar | Dewan Bahadur S. Bavanandam, Pillai, Deputy Commissioner of Police, Madras. |
| South Indian Shrines (illustrated) by P. V. Jagadisa Iya, with a foreword from Lord Carmichael. | South Indian Industrials. |

List of Exhibitors in the Madras Court.

- C. C. Acharyulu & Sons, Bullion Merchants, Ponnappa Chetty Street, Park Town, Madras.
- The Agricultural Department of the Government of Madras.
- Alex. Hussam & Co., Boot and Shoe Merchants, 6, Stringer's Street, George Town, Madras.
- Bandla Bapayya Chetty, President, Union Board, Vetapalayam, Guntur District, Exhibitor of Cotton Goods.
- The R.C.C. Baram's Indian Condiment Works, Royapettah, Madras.
- The Bellary Exhibition Committee, Bellary.
- Best & Co., Ltd., Madras.
- Brunnschweiler & Co., A., Dealers in Handkerchiefs, Post Box No. 106, Madras.
- Geo. Brunton & Sons, Engineers, Ship and Boat Builders, Iron Founders, Cochin, Malabar Coast.
- The Buckingham and Carnatic Co., Ltd., Post Box No. 66, Madras.
- V. Chellapillay Chetty & Co., Indian Condiment Manufacturers, General Import and Export Merchants, Commission Agents, 6, Davidson Street, Madras.
- A. K. Chengalvaraya Chetty, Cloth Merchant and Commission Agent, 373, Hodgesonpet, Conjeevaram.
- B. Chinnamalla Reddi, Asbestos Merchant, Kondapuram, Cuddappah District. Chinnaswami Modatiar, Madras.
- The Chrome Leather Co., Tanners and Manufacturers, Chromepet, near Madras. The Cochin Government.
- R.R.A. Court Beadon, K.C.S.G., Government Victoria Hospital, Triplicane, Madras.
- A. Danadeva Nainar & Son, Wholesale and Retail Dealer in Silk and Cotton Goods, Arni, North Arcot District.
- S. David Nadar, Revenue Divisional Officer, Salem.
- D'Cruz & Co., Cigar Manufacturers, Coconada, Godavari District.
- The Delta Exporting and Importing Co., Post Box No. 1, Palakol, Kistna District.
- Devaraja Pillai, V., Carpet Manufacturer and Contractor, Bhavani, Coimbatore District.
- Dharmaraja Ayyar, K. S., Pappadam Manufacturer, 7, Pycrofts First Street, Royapettah, Madras.
- Dickins, E. K., Magnesite Bungalow, Hastampatti, Salem District.
- The East India Produce Co., Exporters and Importers, Specialities : Dressed Palmyra Fibres and Buffalo Horns, Post Box No. 28, Coconada.
- The Fisheries Department of the Government of Madras.
- The Forest Department of the Government of Madras.
- Gaston, A. H., The Wynaad Mica Mines, Dents Gardens, Cathedral Post, Madras.
- C. Muhammad Ghouse & Sons, Inventors and Specialists in Pith Turbans, Govindappa Nayak Street, George Town, Madras.
- Rao Sahib Kone Gopaladu, Ellore, Kistna District.
- The Government Cinchona Department.
- G. M. Guruswami Chetty, Silk Merchant, Ammapet, Salem.
- The Indian Aluminium Co., Ltd., 32, Triplicane High Road, Madras.
- The Industries Department of the Government of Madras.
- Ismail Hajee Abdullah, Oriental Carpets and Rugs Manufacturing Agent, Ellore, Kistna District.
- Jackson, G. H., Collector of Guntur.
- The Jail Department of the Government of Madras.

List of Exhibitors in the Madras Court—*contd.*

- Jamal Moideen Saib & Co., Dealers in Tanned Skins and Hides, 16, Thumbu Chetty Street, Madras.
- The Jeypore Estate.
- Jonah & Joseph, Manufacturers and Exporters, Narasapur, Kistna District.
- Raja Sahib of Kalahasti.
- Syed Kamruddin Sahib, Wood Carver and Cabinet Maker, Town Hall Road, Madura.
- P. S. Kandaswami, Sa, Silk and Cloth Merchants, 71, Chavadi Street, Sekupet, Conjeevaram.
- The Kistna Collector.
- Theckiyam V. Krishna Ayyar, Silk and Cloth Merchant, Athuvali Nadappu Street, Kumbakonam.
- V. K. Krishnappa Chettiyar, Cloth Merchant, 85, Chetti Street, Little Conjeevaram.
- S. S. Krishna Sa & Sons, Cloth Merchants, Conjeevaram.
- G. R. Krishnaswami Chetty & Co., Wholesale Importers and Exporters, Specialists in Indigo, No. 3 Causee Chetty Street, George Town, Madras.
- R. M. Krishnaswami Chetty, Brass Merchant, Melahumari First Street, Karuthattangudi P.O., Tanjore.
- Rao Bahadur K. Krishnaswami Nayudu Garu, M.L.C., Chairman, Municipal Council, Vellore, North Arcot District.
- The Kurnool Exhibition Committee.
- K. Lakshmiah Nayudu, General Merchants, Guntur.
- T. A. Lingiah Nayudu, Headman, Karigeri Village, Gudiyatham Taluk, North Arcot District.
- M. A. K. Madhanna Chettiyar, c/o Tahsildar, Tiruppur, Coimbatore District.
- The Madras Ayurvedic Pharmacy, Ltd., 44, Govindappa Nayak Street, George Town, Madras.
- The Madras Mail, Post Box No. 1, Madras.
- The Madras United Spinning and Weaving Mills Co., Ltd., Madras.
- The Magnesite Syndicate, Ltd., Suramangalam, Salem District.
- The Mahant of Tirupati.
- The Malabar Exhibition Committee.
- The Marine Department of the Government of Madras.
- K. Mathews & Sons, Narasapur.
- The M.A.R.N. Metal Factory, Kalahasti, 30, Coral Merchant Street, Madras.
- P. Mittu Laul Lahal, Superior Curry Powder Manufacturer, 21, Nagappayyar Street, Triplicane, Madras.
- T. A. Muthuswami Ayyar, Lace and Silk Merchant, Shevapet, Salem.
- Nallasivayya, Silk Cloth Merchant, Berhampore, Ganjam District.
- Dewan Bahadur T. Numberumal Chettyar, "Crynant" Chetpet, Madras.
- Narsoji & Bros., The Crown Sports House, Bellary.
- The Nawab of Banganapalle.
- The North Arcot Exhibition Committee.
- Panakala Row & Co., Cereal Food Manufacturers, Palakol, Kistna District.
- Babu Paramananda Sahu, Aska Sugar Works and Distillery, Berhampore, Ganjam District.
- A. Peddu Chetty, Silk Merchant, 3rd Festival Mandapam, Street, Little Conjeevaram.
- Peirce Leslie & Co., Calicut.
- V. Perumal Chetty & Sons, The Madras Pencil Factory, Washermanpet, Madras.
- A. Perumal Pillai, Cloth Merchant, Sivan South Street, Velipalayam, Tanjore.
- A. K. Ponselvalai Chettiyar, c/o Tahsildar Tirupur, Coimbatore District.
- The Madras Port Trust, Madras.

List of Exhibitors in the Madras Court—*contd.*

- J. Prioris, B.Sc., H.E.C. (Paris), Essential Oils and Perfumes, "Atihur" Flower Plantations, Yercaud, Salem District.
- Chinnam Raghunatha Patro, Taluk Board Member, Ghoomsur, Belligunta, Ganjam District.
- T. A. Rahiman & Sons, Attar Merchants, 10, China Bazaar Road, Madras. The Third Raja of Calicut.
- Ramabhadra Reddi, Village Headman, Siruvanthadu, Villupuram Taluk, South Arcot District.
- Rao Sahib K. V. Ramachari, B.A., M.L.C., Sole Proprietor of Messrs. K. V. Ramachari & Sons, Importers of Dyes, Yarns, Piece goods and Sundries, "Lakshmi Vilas," Madura.
- R. Ramalingam, Silk Merchant, Kandukur, Nellore District.
- Pindiprolu Ramanurti Pantulu & Gadireddi Subrahmanya Nayudu, Golapalam, Godavari District.
- Duggu Ramanna, Silk Merchant, Dharmavaram, Ananatapur District.
- P. K. Ramaswamier & Bros., Madura Dyeing Factory, South Gate, Madura.
- M. V. Ramaswami Chetty, Cloth Merchant, Conjeevaram.
- V. Ramaswami Nayudu, Cloth Merchant, Kornadu, Mayavaram, Tanjore District.
- Ramnad Collector, Madura.
- Rani Ranga Ayyar & Sons, Silk, Lace and Cloth Merchants, Gerudalaya Street, Kumbakonam.
- Onte. Rangaswamy, Weaver of Silk Sarees, etc., Kollegal.
- A. Sambasiva Pathar, Artistic and Statues Manufacturers, Kosapalayam, Pondicherry.
- The Sandur Estate.
- K. Sankaranarayana Asari, c/o Mr. A. F. Harvey, Virudupatti, Ramnad District.
- B. Sankara Sastri, Government Pleader, Chicacole, Ganjam District.
- Pangal Sarvotham Nayak, Merchant, Mangalore.
- Mrs. H. Saville, Staunton Lodge, 10 Church Road, Vepery, Madras.
- C. W. Schomburg, Retreat, Kilpauk, Madras.
- The Schomtir Salt Co., 17, Purasawalkam High Road, Madras.
- The School of Arts and Crafts, Madras.
- Seena Vana & Co., Dealers in Palmyra Fibres, etc., of Tuticorin.
- A. S. M. Shamsuddin Sahib Bahadur, Manufacturer of the famous Suguntha Mukkuthool and Madras Snuff, etc., 106, Sowcarpet, Madras.
- J. A. Sharwood & Co., 10, Botolph Lane, London, E.C. 3.
- The Rev. M. Simon, "The Hermitage," Narasapur, Kistna District.
- N. V. Singariah, Banker, Gold, Silver and Coral Merchant, Vijianagaram. The Sivaganga Estate.
- Smith's Indian Condiment Co., St. Thomas Mount, Madras.
- Somaraju & Bros., Muppanna, Manufacturers of Silk and Cotton Goods, Peddapuram, Godavari District.
- Somaraju & Karra Mallikarjanudu, Bommanna, Silk and Cloth Merchants, Uppada, Godavari District.
- The South India Industrials, Ltd., Madras.
- Spencer & Co., Ltd., Madras.
- The Standard Furniture Co., Kallai, Malabar.
- P. Sundaram & Sons, Engravers, Mechanics, Jewellers, Coimbatore.
- P. S. V. R. Swamy & Co., Fancy Colour Dyers, Ramnad Road, Madura.
- Miss Tarapore, Behroza Schrab, 45, Main Road, Royapuram.
- The Trichinopoly Exhibition Committee.
- Vadlamudi Varadarajalu Nayudu, Kalamcari Merchant and Commission Agent, Masulipatam.

List of Exhibitors in the Madras Court—*contd.*

The United Coffee Supply Co., Ltd., Coimbatore.

Murari Varada Ayyar, K. Ramalinga Ayyar and P. S. Balakrishna Ayyar,
Cloth Merchants, Salem.

R. G. Varada Ayyar, Cloth Merchant, 30 Patnool New Street, Kumbakonam.
K. Veerappa Asari of Cocanada.

V. C. Vellingri Gounder, M.L.C., Vellakkinar Post, Coimbatore District.

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Ega. Venkatachalam Chetty & Son, Condiment Manufacturers, 27, Cope
Venkatachala Ayyar Street, Madras.

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Vinnakota Chinna Ramiah Nayudu and Vinnakota Venkataswami Nayudu,
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BENGAL

THE Bengal Court represents the province of Bengal now administered by a Governor in Council. This province with the Indian States of Tripura and Cooch Behar covers an area of 84,000 square miles and has a population of 46,500,000.

Bengal is principally an agricultural country, and its main industries are those which are connected, directly or indirectly with agriculture. The bulk of the area under cultivation is devoted to the raising of food crops. The chief of these crops is Paddy. Rice, which is paddy husked, is the staff of life of about one-third of the Indian population.

The cultivation of Pulses, spices, oil-seeds—chiefly mustard and rape—and sugar cane claims a fair acreage.

In the Himalayas and Sub Himalayas and in the hilly parts of the Chittagong district tea is cultivated. These teas enjoy a high reputation for aroma and liquor.

About 250,000 acres are under tobacco cultivation, much of the tobacco being exported to Burma. The growth and the selection of new varieties of tobacco and the subsequent manufacture have engaged the attention of the Agricultural Department of Bengal in its experimental tobacco farm at Rungpur.

Of fibre-producing plants jute claims the largest acreage. Peculiarly a native of Bengal it overshadows the other fibres mesta, sunn, hemp, and rhea. It has now developed an industry of its own, and its mills over 80 in number are dotted all over on the banks of the River Hugli, Calcutta being the emporium of the great foreign jute trade. It employs 327,000 workers and 2,000,000 to 3,000,000 cultivators depend chiefly on this crop for their living. The Indian Jute Mills Association has on view samples of raw jute, various jute fabrics, gunny bags and grain sacks.

Lac—the resinous incrustation formed on the turgid of certain trees through the action of the lac insect—is gathered in districts bordering on Behar and Orissa. The various grades of lac and shellac, and the manifold uses to which they are put are represented in this Court.

The resources of the forests of Bengal await commercial exploitation, though a beginning has been made. The tanning industry, once languishing in the midst of Nature's bounty in the profusion of tanning stuffs for lack of enterprise and organised research, is now developing on sound lines. The Calcutta Research Tannery in its laboratory fitted with up-to-date apparatus and in its demonstration tannery conducts researches and analytical work and carries on tanning experiments.

The culms of various grasses are sliced, and woven into mats which make inviting bed-covers, pleasant to lie on in sultry nights.

Within recent years, Bengal has made great progress in the development of her industries. European and Indian capital and enterprise are playing their part in these activities.

Not all these recent developments are represented in the Court, as, for various reasons, it has not been found possible for the promoters of several industries to participate in the Exhibition. The most vigorous of these industries is the chemical a direct result of the inclusion of science in the curriculum of the University—Bengal can now boast of some of the best equipped chemical works in India and there is every reason to believe that Bengal will soon monopolise the production of caffeine and strychnine.

The canning industry is represented by assortments of canned fruits, vegetables, condiments, jams and jellies and Indian sweets and syrups.

Next to agriculture, weaving engages the largest number of men and women. It is remarkable that, in spite of the keen competition of the power loom, the hand-loom weaving industry, handicapped though it has been by lack of organisation, has survived. This must be attributed to a preference for local characteristics as a feature of production and to the intrinsic excellence in respect of durability of the cloth turned out by the Indian loom.

Within recent years the Swadeshi movement—the demand for country made goods—has given a great impetus to hand-loom production. With this increasing demand the spinning wheel, the chairka, has found its way into households in all parts of Bengal. A model of the charka and samples of khaddar—the cloth prepared from hand-made yarn—are on view.

The border designs on the saris and the embroidery work on muslins form an interesting and artistic study. The various choice checked and striped patterns of fabrics also display good taste.

The samples of Dacca muslin on view in the Textile Section represent an industry which has decayed for want of support. These samples will evoke admiration and their exquisite fineness will explain the atmosphere of Oriental ease, softness and grace clinging to the names "Evening Dew," "Running Water," and "Woven Air." The gossamer texture of the old time Dacca muslins also accounts for the story which centres round the Mogul Emperor, Aurangzeb. It is reported that when once he chided his daughter for appearing insufficiently clad he was met by an assurance from her that she was draped in seven-fold muslin.

The silk industry from the cultivation of the mulberry trees and the rearing of cocoons, to the dyeing and finishing of fabrics, employs a large number of workers. There has indeed been a falling off in the high degree of excellence of these silk fabrics, and the world competition has been a serious menace, but the efforts of the Department of Agriculture to adapt the industry to the changed conditions has led not only to a growing appreciation of these silks among Indians, but also to an increasing demand overseas for such dress-pieces. The texture, tint and gloss of the silk pieces produced in Bengal are of various degrees and while some make choice dress and gown pieces, others are adapted to suits for the roughest wear.

The perfect finish of the brass and bell metal ware and the variety of shapes distinctive of the districts in which they are made are well represented by the exhibits in the Court.

The toys and figures of the ivory workers in Murshidabad reputed for their neatness and accuracy still find their way to European markets through Bombay. The fineness of this work is represented by an ivory mat margined with gold and silver lent by the Nawab of Dacca.

Dacca, in addition to its famous muslins, has a reputation for its silver filigree work. Several specimens of this work of very delicate workmanship, will doubtless be highly appreciated.

The clay models of Krishnagar, are in great demand; the modellers pay great attention to detail and harmony of arrangement.

The exquisite couch shell work of Bengal are noted for their finish and fineness of cutting.

There are also on view exhibits which point to the artistic possibilities of mother-o'-pearl.

Silk and cotton weavers, couch shell workers and clay modellers will give demonstrations of their working processes in the Court.

The embroidery and lace work from the Kalimpong Industrial School will compare most favourably with high-class European work, and the carpets and rugs from the Baranajore Widows Industrial Home represent an industry started to assist Indian widows and is one of great promise as it meets the demand for something artistic for ordinary purposes at reasonable prices. To

the woman of Bengal nothing is a reject—her economical turn of mind combined with her artistic sense is seen in her use of fish-scale for portraiture and in the use of the threads of the borders of waist-cloths and saris for embroidering muslin pieces.

Calcutta, the Capital of Bengal, and till recently the Capital of India, and justly known as the second city in the Empire is well represented in the Court. The model of the All-India Victoria Memorial—India's tribute to the memory of the great Queen, and now considered to be the finest building in Calcutta—is displayed in this section.

The activities of the Calcutta Improvement Trust which in 1912 started its operations of opening up congested areas by driving wide thoroughfares through them, of improving communication between the different parts of the city, and of providing open spaces, promise to transform the city into one which may then deservedly claim to be the City of Palaces.

The Port of Calcutta serves not only Bengal, but also the adjacent provinces. The Commissioners of the Port have on view a model of their great scheme—the King George Docks—to provide adequately for the great expanse of trade.

Some models of steam boats and cargo flats serve to remind one of the fact that the waterways of Bengal are its highways.

The model of Mt. Everest, the scaling of which by the latest band of intrepid explorers was so intimately associated with Darjeeling which formed the base of their operations, is on view. This model has been based on maps of the officer of the Survey of India attached to the Mount Everest Expedition of 1921, with the assistance of photographs lent by the Mount Everest Committee.

| Exhibits. | | | | | | Exhibitors and their Addresses. | |
|-------------------------------|----|----|----|----|----|--|-----|
| I.—Soils. | | | | | | | |
| Samples of soils | .. | .. | .. | .. | .. | Dept. of Agriculture, Bengal. | |
| II.—Raw Products. | | | | | | | |
| Paddies | .. | .. | .. | .. | .. | Dept. of Agriculture, Bengal, and Dawn & Co. | |
| Rice .. | .. | .. | .. | .. | .. | Do. | do. |
| Cereals | .. | .. | .. | .. | .. | Do. | do. |
| Pulses | .. | .. | .. | .. | .. | Do. | do. |
| Cocoanut | .. | .. | .. | .. | .. | Do. | do. |
| Fibres | .. | .. | .. | .. | .. | Do. | do. |
| Cotton | .. | .. | .. | .. | .. | Do. | do. |
| SPICES— | | | | | | | |
| Curry powder | .. | .. | .. | .. | .. | Dawn & Co., and Pioneer Condiment Co. | |
| GUMS AND RESINS— | | | | | | | |
| Lac | .. | .. | .. | .. | .. | Dawn & Co. and Angelo Bros. | |
| Shellac | .. | .. | .. | .. | .. | | |
| OILS— | | | | | | | |
| Edible, industrial, medicinal | | | .. | .. | .. | Dawn & Co. and S. N. De. | |
| III.—Horticulture. | | | | | | | |
| Horticultural Seeds | .. | .. | .. | .. | .. | Dept. of Agriculture, | |

| Exhibits. | | | | | Exhibitors and their Addresses. | |
|-----------------------------|--------------------------------|-------------------------|--------------|----|--|-----|
| IV.—Food Industries. | | | | | | |
| A. | Refined sugar | .. | .. | .. | Dept. of Agriculture. | |
| B. | <i>Canning and Condiments—</i> | | | | | |
| | Canned fruits | .. | .. | .. | Pioneer Condiment Co. | |
| | Canned sweets | .. | .. | .. | and Bengal Canning & Condiment Co., and Ahmuty & Co. | |
| C. | Jams and jellies | .. | .. | .. | Pioneer Condiment Co. | |
| V.—Forest Products. | | | | | | |
| | Tan stuffs from | Sunderban Forest | .. | .. | Calcutta Research Tan- | |
| | Do. | Darjeeling Forest | .. | .. | nery. | |
| | Do. | Simla Forest | .. | .. | Do. | do. |
| | Do. | Commonly used in Bengal | .. | .. | Do. | do. |
| VI.—Sericulture. | | | | | | |
| | Cocoons | .. | .. | .. | Dept. of Sericulture. | |
| | Yarns | .. | .. | .. | Do. | do. |
| | Silk jut | .. | .. | .. | Do. | do. |
| | Reeling machine | .. | .. | .. | Do. | do. |
| | Model rearing house | .. | .. | .. | Do. | do. |
| | Spinning and rearing tray | .. | .. | .. | Do. | do. |
| | A painting of a silk nursery | .. | .. | .. | Do. | do. |
| VII.—Textiles. | | | | | | |
| A. | JUTE— | | | | | |
| | Bales of raw jute | .. | .. | .. | Indian Jute Mills Asso- | |
| | Gunny bales | .. | .. | .. | ciation. | |
| | Hessians | .. | .. | .. | Do. | do. |
| | Canvas | .. | .. | .. | Do. | do. |
| | D.W. tarpaulin | .. | .. | .. | Do. | do. |
| | Egyptian grain sack cloth | .. | .. | .. | Do. | do. |
| | Twill cloth | .. | .. | .. | Do. | do. |
| | Australian corn sack | .. | .. | .. | Do. | do. |
| | Sugar bag cloth | .. | .. | .. | Do. | do. |
| | Cuban sugar bag cloth | .. | .. | .. | Do. | do. |
| | D.W. flour bag cloth | .. | .. | .. | Do. | do. |
| | Heavy ice bag cloth | .. | .. | .. | Do. | do. |
| | Sacking warp sliver | .. | .. | .. | Do. | do. |
| | Sacking weft sliver | .. | .. | .. | Do. | do. |
| | Hessian sliver | .. | .. | .. | Do. | do. |
| | Filled bobbins sacking | weft rove | .. | .. | Do. | do. |
| | Do. | do. | warp rove | .. | Do. | do. |
| | Do. | do. | hessian rove | .. | Do. | do. |
| | Do. | do. | canvas rove | .. | Do. | do. |
| | Spool sacking warp yarn | .. | .. | .. | Do. | do. |
| | Spool hessian | do. | .. | .. | Do. | do. |
| | Spool canvas | do. | .. | .. | Do. | do. |
| | Spool selvedge twist | .. | .. | .. | Do. | do. |
| | Spool hemming twist | .. | .. | .. | Do. | do. |
| | Hank sewing twist | .. | .. | .. | Do. | do. |
| | Cops sacking waft yarn | .. | .. | .. | Do. | do. |
| | Cops hessian waft yarn | .. | .. | .. | Do. | do. |
| | Cops canvas waft yarn | .. | .. | .. | Do. | do. |

VII.—Textiles—*contd.*

| Exhibits. | | | | | Exhibitors and their Addresses. | |
|---|------|----|----|----|--|-----|
| Egyptian grain sacks | .. | .. | .. | .. | Do. | do. |
| Twill bags | .. | .. | .. | .. | Do. | do. |
| Australian corn sacks | .. | .. | .. | .. | Do. | do. |
| Cuban sugar bags | .. | .. | .. | .. | Do. | do. |
| D.W. flour bags | | .. | .. | .. | Do. | do. |
| Heavy seed bags | .. | .. | .. | .. | Do. | do. |
| Sugar bags | .. | .. | .. | .. | Do. | do. |
| Hand woven jute cloth striped and plain | .. | .. | .. | .. | Bengal Home Industries Association. | |
| Jute yarn | .. | .. | .. | .. | Do. | do. |
| Hand woven rope hangers | .. | .. | .. | .. | Do. | do. |
| Do. jute rope | .. | .. | .. | .. | Do. | do. |
| Do. stretcher | .. | .. | .. | .. | Do. | do. |
| Do. bag | .. | .. | .. | .. | Do. | do. |
| B.—COTTON. | | | | | | |
| A. Yarn (home spun) | .. | .. | .. | .. | Bengal Home Industries Association. | |
| B. FABRICS— | | | | | | |
| Muslin hand-made yarns | .. | .. | .. | .. | Prakashi Banerjee & Co., and Govinda Ch. Baysak. Bongram, Dacca. | |
| Foreign yarn | .. | .. | .. | .. | Prakashi Banerjee & Co., and Govinda Ch. Baysak. Bongram, Dacca. | |
| Figured dacca cotton fabrics (Jamdani) | .. | .. | .. | .. | Bengal Home Industries Association, Kala Chand & Radha Shah, Dacca, and R. R. G. Basah Bros. | |
| Cotton checks | .. | .. | .. | .. | Bengal Home Industries Association and Laks Mondras Jedhraj (Serajgung). | |
| Striped cloth | | .. | .. | .. | Do. | |
| Cloths for men with border | .. | .. | .. | .. | Do. | |
| Cloths for women with border | .. | .. | .. | .. | Do. | |
| Coatings | .. | .. | .. | .. | Do. | |
| Trouserings | .. | .. | .. | .. | Do. | |
| Turbans | .. | .. | .. | .. | Do. | |
| Shirtings | .. | .. | .. | .. | Do. | |
| Chaddars—Lepcha Bhuttia and Sikkim uncut rolls. | .. | .. | .. | .. | Do. | |
| Bed sheets | .. | .. | .. | .. | Do. | |
| Window curtains | .. | .. | .. | .. | Do. | |
| Scarves | .. | .. | .. | .. | Do. | |
| Kummerbands | .. | .. | .. | .. | Do. | |
| Khaddar (home-spun yarn fabrics) | .. | .. | .. | .. | Do. | |
| CHARKA— | | | | | | |
| The spinning wheel and frame used in India from time immemorial | .. | .. | .. | .. | Bengal Home Industries Association. | |
| C. SILK-UNBLEACHED, PLAIN WHITE, COLOURED, FIGURED, TUSSORE AND OTHER SILKS— | | | | | | |
| Gown lengths and pieces, plain white and striped | .. | .. | .. | .. | Bengal Curios Corner (Elnecave & Penso). | |
| Scarves | .. | .. | .. | .. | Manbhum Silpa Samiti. | |
| Suitings | .. | .. | .. | .. | B. Rose & Co., Berhampur. | |
| Shirtings | .. | .. | .. | .. | B. Rose & Co., Berhampur. | |

VII.—Textiles—*contd.*

| | | | | | | Exhibitors and their Addresses. | |
|---------------------------------|----|----|----|----|----|--|-----|
| Curtains | .. | .. | .. | .. | .. | Bengal Home Industries Association. | |
| Table cloth | .. | .. | .. | .. | .. | Raja of Lalgola. | |
| Gown length of silk waste | | | | .. | .. | Indore Trading Company. | |
| Handkerchiefs | .. | .. | .. | .. | .. | Bengal Home Industries Association. | |
| D. MIXED FABRICS— | | | | | | | |
| A. Cotton and silk | .. | .. | .. | .. | .. | Bengal Home Industries Association. | |
| Suitings | .. | .. | .. | .. | .. | Do. | do. |
| Shirtings | .. | .. | .. | .. | .. | Do. | do. |
| Curtains | .. | .. | .. | .. | .. | Do. | do. |
| Loongis | .. | .. | .. | .. | .. | Do. | do. |
| B. Jute and cotton | .. | .. | .. | .. | .. | Do. | do. |
| E. MATS AND MATTING— | | | | | | | |
| Coir and other mats | .. | .. | .. | .. | .. | D. C. Dutt & Co., Bengal Home Industries Association, Dept. of Agriculture and Baranagore Widows' Industrial Home. | |
| F. CARPETS, RUGS AND BLANKETS— | | | | | | | |
| (1) Carpets | .. | .. | .. | .. | .. | Dept. of Agriculture, Baranagore Widows' Industrial Home. | |
| (2) Rugs | .. | .. | .. | .. | .. | Bengal Home Industries Association, Baranagore Widows' Industrial Home, and Bengal Curios Corner (Elneave & Penso). | |
| (4) Cotton carpets (Statranjis) | .. | .. | .. | .. | .. | Manager, Jail Depot, Calcutta, and Bengal Home Industries Association. | |
| (5) Blankets | .. | .. | .. | .. | .. | Bengal Home Industries Association. | |

VIII.—Leather Industries.

A. SKINS AND LEATHER—

| | | | | | | | |
|-------------------------------|----|----|----|----|----|----------------------------|--|
| Lizard, snake and tiger skins | .. | .. | .. | .. | .. | Calcutta Research Tannery. | |
|-------------------------------|----|----|----|----|----|----------------------------|--|

TANNED LEATHER—

| | | | | | | | |
|---|---------------|-----|------------|----------------------------|-----|-----|--|
| Samples of Cow hides, tanned with different | | | | Calcutta Research Tannery. | | | |
| | | | tan stuffs | | | | |
| Do. | Buffalo hides | do. | .. | .. | Do. | do. | |
| Do. | Sheep skins | do. | .. | .. | Do. | do. | |
| Do. | Goat skins | do. | .. | .. | Do. | do. | |
| Do. | Chrome willow | do. | .. | .. | Do. | do. | |
| Do. | Chrome box | do. | .. | .. | Do. | do. | |
| Do. | Glance kid | do. | .. | .. | Do. | do. | |
| Do. | Sole leather | do. | .. | .. | Do. | do. | |

| Exhibits. | | | | | | Exhibitors. | |
|-------------------|----|----|----|----|----|--|----------|
| B. LEATHER GOODS— | | | | | | | |
| Gents' boots | .. | .. | .. | .. | .. | Calcutta | Research |
| Ladies' shoes | .. | .. | .. | .. | .. | Tannery (Dept. of Industries, Bengal). | |
| Suit cases | .. | .. | .. | .. | .. | Calcutta | Research |
| | | | | | | Tannery (Dept. of Industries, Bengal), and | |
| | | | | | | Ahmuty & Co., Calcutta. | |

IX.—Chemical Industries.

| | | | | | | | |
|--------------------------------------|----|----|----|----|----|--|--|
| Samples of fertilizers | .. | .. | .. | .. | .. | Dept. of Agriculture, Bengal, and Dawn & Co. | |
| Pharmaceutical medicines | .. | .. | .. | .. | .. | { Smith Stanistreet & Co., Ltd., and B. K. Paul & Co., and D. Waldie & Co., Ltd. | |
| Tinctures and galencial preparations | .. | .. | .. | .. | .. | | |
| Fine and heavy chemicals | .. | .. | .. | .. | .. | | D. Waldie & Co., Ltd., and Ahmuty & Co. |
| Red lead | .. | .. | .. | .. | .. | D. Waldie & Co., Ltd., and | |
| Essences | .. | .. | .. | .. | .. | S. N. De. | |
| Essential oils | .. | .. | .. | .. | .. | Dawn & Co. and | |
| Forest products | .. | .. | .. | .. | .. | D. Waldie & Co., Ltd. | |
| Surgical instruments | .. | .. | .. | .. | .. | B. K. Paul & Co. | |
| Hospital requirements | .. | .. | .. | .. | .. | Do. do. | |
| Laboratory appliances | .. | .. | .. | .. | .. | Do. do. | |
| Toilet requisites | .. | .. | .. | .. | .. | B. K. Paul & Co. and Dr. S. K. Burman. | |
| Patent medicines | .. | .. | .. | .. | .. | B. K. Paul & Co., Dr. S. K. Burman and Smith Stanistreet & Co., Ltd. | |
| Indigeneous drugs | .. | .. | .. | .. | .. | Smith Stanistreet & Co., Ltd., B. K. Paul & Co., D. Waldie & Co., Ltd. and Standard Drugs. | |
| Botanic drugs | .. | .. | .. | .. | .. | S. N. De, Calcutta. | |
| Fire extinguishers | .. | .. | .. | .. | .. | Ahmuty & Co., Ltd. | |
| Extermin-Ant | .. | .. | .. | .. | .. | Do. do. | |

X.—Arts Industries—

A. FINE ART—

| | | | | | | | |
|-----------------------------|----|----|----|----|----|-------------------------------------|--|
| Darjeeling Himalayan views | .. | .. | .. | .. | .. | A. E. Harris. | |
| Landscapes in water colours | .. | .. | .. | .. | .. | Bengal Home Industries Association. | |
| Oil paintings | .. | .. | .. | .. | .. | A. K. Nag. | |
| Alpana panel designs | .. | .. | .. | .. | .. | Mrs. Hazra (Bankura). | |
| Water colour paintings | .. | .. | .. | .. | .. | A. C. Chatterjee. | |

X.—Art and Industries—*contd.*

| Exhibits. | Exhibitors. |
|--|---|
| B. EMBROIDERY LACE AND TRIMMINGS — | |
| Assortment of Kanthas, <i>i.e.</i> , | |
| Cotton material embroidered with coloured cotton yarns | Bengal Home Industries Association. |
| Embroidered Silks | Do. do. |
| Do. Flounces | Do. do. |
| Do. Shoes | Do. do. |
| Varieties of laces | Do. do. |
| Table centres | Do. do. |
| Caps | Do. do. |
| Embroidered Children's goods | Kalimpong Industrial |
| Do. Lingerie | Do. School. |
| Do. Household linen | Do. do. |
| Kashmir shawls, old and rare pattern | A. Sen. |
| Kasida (Muga embroidered cloth) | Bengal Home Industries Association. |
| Chikan (cotton embroidery) | Baraset Chikan Co-operative Society. |
| Needlework picture of Rabendra Nath Tagore | Mrs. K. S. Pal. |
| Embroidered bed quilts | Bengal Home Industries Association. |
| Gold and silver lace on silk | Tripura State. |
| C. GOLD AND SILVER WORK— | |
| Silver work | G. Roy & Sons and Bengal Home Industries Association. |
| Silver enamelled sleeve links | Bengal Home Industries Association. |
| Silver filigree works | G. Roy & Sons, Harinarayan & Radha Charan Poddar, Dacca, and Tripura State, Durbar. |
| Silver model of the Ashanmunzio Palace of the Nawab Bahadur of Dacca | |
| Silver model of the Hosainidalan of the Nawab Bahadur of Dacca | |
| Nepalese Brides Gold Ornament | H. L. Dikshit. |
| Tinsel ornaments | O. C. Ganguli. |
| JEWELLERY— | |
| Loose gems | Lakhiraj Sewakram. |
| Jewellery of varieties | Lakhiraj & Sewakram Economic Jewellery Co Bengal Curios Corner (Elnecave & Penso). |
| IVORY— | |
| Works in Ivory-Tusk (540) | Tripura State. |
| Do. Statuette (541) | Do. |
| Assortment of ivory articles | Bengal Curios Corner (Elnecave & Penso). |
| Images and toys | Bengal Home Industries Assoc. (Dulav Blaskar Khagra Berhamfund). |

X.—Art and Industries—*contd.*

| Exhibits. | | | | | Exhibitors. | |
|--|-------------------------|-----|-----|----|-----------------------|--------------------|
| MOTHER-O'-PEARL— | | | | | | |
| Pictures | .. | .. | .. | .. | Chowgachi | Mother-o'-Pearl |
| Buttons | .. | .. | .. | .. | .. | Factory (Jessore). |
| Brooches and other small articles | | | | .. | .. | Do. do. |
| HORN WORK— | | | | | | |
| Horn vermilion pots | .. | .. | .. | .. | Bengal Home Indus- | |
| Horn buttons | .. | .. | .. | .. | tries Assoc. | |
| Horn Chessmen | .. | .. | .. | .. | Eastern Bengal Button | |
| Horn boxes | .. | .. | .. | .. | Mfg. Co. (Dacca). | |
| Horn comb | .. | .. | .. | .. | Do. | do. |
| SHELL ORNAMENTS— | | | | | | |
| Conch Shell Bangles | (plain and set in gold) | | | | Premchand Sur Shank- | |
| Do. Bracelets | | Do. | do. | | hari Bazaar, Dacca. | |
| Do. Wristlets | .. | Do. | do. | | Ram Gopal Dhar. | |
| Do. Sleeve links | | Do. | do. | | Economic Jewellery | |
| Do. Serviette rings | | .. | .. | .. | Wks., 33 Cornwallis | |
| Do. Rings | .. | .. | .. | .. | Street, Calcutta. | |
| METAL WARE— | | | | | | |
| Ascetic's water vessels | .. | .. | .. | .. | Bengal Home Indus- | |
| Bell metal Trays | .. | .. | .. | .. | tries Association. | |
| Do. Cups | .. | .. | .. | .. | Do. | do. |
| Do. Dishes | .. | .. | .. | .. | Do. | do. |
| Do. Plates | .. | .. | .. | .. | Do. | do. |
| Do. Bowls | .. | .. | .. | .. | Do. | do. |
| Do. Egg cups | .. | .. | .. | .. | Do. | do. |
| Do. Hobble bobble stands | | .. | .. | .. | Do. | do. |
| Brass Candle stands | .. | .. | .. | .. | Do. | do. |
| Do. Flower vase | .. | .. | .. | .. | Do. | do. |
| Do. Pot plants | .. | .. | .. | .. | Do. | do. |
| Do. Figures of animals | .. | .. | .. | .. | Do. | do. |
| Do. Pitcher | .. | .. | .. | .. | Do. | do. |
| Do. Tables | .. | .. | .. | .. | Do. | do. |
| Copper horn | .. | .. | .. | .. | Ahmuty & Co. | |
| Plates engraved with Panel design | | .. | .. | .. | Bengal Home Indus- | |
| Do. do. Portraits | .. | .. | .. | .. | tries Association | |
| Do. do. Oriental subjects | .. | .. | .. | .. | Do. | do. |
| Plain & ornamented Copper boxes | .. | .. | .. | .. | Do. | do. |
| Do. do. Brass boxes | .. | .. | .. | .. | Do. | do. |
| Ganja Bate (nest of bell metal cups) | .. | .. | .. | .. | Do. | do. |
| Birbhum bowls | .. | .. | .. | .. | Do. | do. |
| Bankura bowls | .. | .. | .. | .. | Do. | do. |
| Kukri (Gurkha knife with ivory handle) in gold | | | | | H. L. Dikshit and | |
| and silver scabbard and plain scabbard | | | | .. | Bengal Home Indus- | |
| | | | | | tries Association. | |
| Brass pot plants | .. | .. | .. | .. | G. Roy & Sons (Dacca) | |
| Fancy brass ware | .. | .. | .. | .. | Bengal Curios Corner | |
| | | | | | (Elnecave & Penso) | |

| | Exhibits. | Exhibitors. |
|---|-----------|---|
| TOYS— | | |
| Rag dolls | | Bengal Home Industries Association. |
| Lacquered toys | | Do. do. |
| Papier mache toys | | Do. do. |
| Wool toys | | Do. do. |
| Pasteboard unbreakable toys | | Do. do. |
| Clay figures and animals | | Do. do. |
| Clay idols | | Do. do. |
| XI.—Clay Modelling— | | |
| Single figures | | Bengal Home Industries Association. |
| Subject models | | Maharaja Sir Manindra Chandra Nandi of Cossimbazar, and Bengal Home Industries Association. |
| XII—His Majesty's Mint Exhibits— | | |
| Coins | | Calcutta Mint and Bombay Mint. |
| Photographs of the mint and workshops at Bombay | | Bombay Mint. |
| TOWN PLANNING— | | |
| 12 in. Map of Calcutta showing the operation of the Calcutta Improvement Trust, past, present and future. | | Calcutta Improvement Trust. |
| A Framed Plan of the crowded Bara Bazaar area, showing a suggested line of approach to the Howrah Bridge. | | Do. do. |
| A Framed Plan showing the portion of Central Avenue Road under construction between Bowbazar Street and Dhurramtalla. | | Do. do. |
| A Model of a portion of Central Avenue, showing typical conditions before and after completion. | | Do. do. |
| A Model of a portion of Russa Road South, after improvement. | | Do. do. |
| Two Albums of Photographs illustrative of the Trust's operations in different parts of Calcutta. | | Do. do. |
| Framed enlargements of aerial photographs of Calcutta. | | Do. do. |
| A Model of Reinforced Concrete Arch Bridge which is being constructed by the Trust across the Circular Canal on the Dum Dum (Belgachia) Road to replace a narrow steel girder bridge. | | Do. do. |
| A plan showing Town Planning and Improvement Schemes in progress in the Karaja area. | | Do. do. |
| A model of Shambazar Park, opened by H.E. The Governor of Bengal. | | Do. do. |
| (a) A model of a typical bustee | | Do. do. |
| (b) A model of an improved type of bustee recommended by the Improvement Trust. | | Do. do. |
| Framed sketches showing blocks of buildings erected for rehousing Anglo-Indians displaced by the Central Avenue Scheme. | | Do. do. |
| A series of 6 in. maps of Calcutta, showing features of great interest. | | Do. do. |

List of Principal Exhibitors

| Name and Address of Exhibitor. | Articles Exhibited. |
|--|--|
| Commissioners for the Port of Calcutta, Strand Road, Calcutta | Model of King George's Docks, and representations of other features of the Port of Calcutta. |
| Calcutta Improvement Trust, Clive Street, Calcutta | Models of City improvement schemes. |
| Indian Jute Mills Association, Royal Ex- change, Calcutta. | Jute. |
| Martin & Co., Ltd., Clive Street, Calcutta .. | Model of the All-India Victoria Memorial. |
| Dept. of Agriculture, Dacca, Bengal. .. | Agricultural products, soils, fer- tilisers, etc. |
| Dept. of Sericulture, Dacca, Bengal .. | Cocoons, silk and models. |
| Calcutta Research Tannery (Dept. of Indus- tries), Calcutta. | Tan stuffs, leather and leather goods. |
| Principal Government Weaving Institute, Serampur, Bengal. | Textiles. |
| Bengal Home Industries Association, Hogg Street, Calcutta. | Textiles and arts industries. |
| Baraset Chikkan Co-operative Societies, c/o Registrar Co-operative Societies, Calcutta. | Cotton embroidery (Chickan). |
| Butto Kristo Paul & Co., Bonfield Lane, Calcutta. | Chemicals and surgical instru- ments. |
| Smith, Stanstreet & Co., Ltd., 18, Convent Road, Entally, Calcutta. | Chemicals. |
| D. Waldie & Co., Ltd., 111, Vansitart Row, Calcutta. | Do. |
| S. N. De, P.O. Box 7851, Calcutta | Indian crude drugs and econ- omic produce. |
| Dr. S. K. Burman, 4, Tarachand Dutt St., Calcutta. | Patent medicines and toilet requisites. |
| Dawn & Co., 87, Old China Bazar Street, Calcutta. | Shellac, manure and forest pro- ducts. |
| Standard Drugs, 285, Bowbazar Street, Calcutta. | Indigenous drugs. |
| Ahmuty & Co., Ltd., 8611, Clive Street, Calcutta. | Chemicals, brassware, fire ex- tinguishers and buckets, chut- neys and suit cases. |
| Angelo Bros., Ltd., P.O. Box 68, Calcutta .. | Shellac. |
| Pioneer Condiment Co., 81, Harrison Road, Calcutta. | Canning and condiment. |
| Bengal Canning and Condiment, 3, Gurudas Dutta Garden Lane, Calcutta. | Canning and condiment. |
| Kalachand Radhachand Shaha, Dacca .. | Textiles. |
| K. K. G. Basak & Bros., 267, Nawabpur Road, Dacca. | Textiles. |
| Hari Narayan and Radha Charan Dey Poddar, Islampur, Dacca. | Silver filigree work. |
| Manbhum Silpa Samiti, Bishnupur, Bengal | Textiles (silk). |
| B. Bose & Co., Khagra, Murshidabad, Bengal | Textiles (silk). |
| D. C. Dutt & Co., 23, Goa Bagan Lane, Calcutta. | Mats and mattings. |
| Das & Co., 14, Cossipur Road, Calcutta .. | Locks. |
| Prem Chand Sur, 48, Sankhari Bazar, Dacca | Conch shell. |

| Name and Address of Exhibitor. | Articles Exhibited. |
|--|--|
| Ram Gopal Dhar, 123, Shankari Bazar, Dacca | Conch shell. |
| Economic Jewellery Works, 33, Cornwallis Street, Calcutta. | Conch shell work and jewellery. |
| Tripura State | Ivory and silver works and Embroidered Textiles. |
| Maharajah Sir Manindra Chandra Nandi, of Cossimbazar. | Clay models. |
| A. Mitra, 13, Beaden Street, Calcutta .. | Curios. |
| O. C. Gangully, Gangully Lane, Calcutta .. | Books and book case. |
| Keelan, Darjeeling | Sikkim and Darjeeling butterflies. |
| Lindgreen, Darjeeling | Sikkim and Darjeeling butterflies. |
| Faridpore Industrial Mission, Faridpore, Bengal. | Country boat models. |
| John King & Co., Strand Road, Calcutta .. | Model of steam boats and cargo flat. |
| Denny & Bros., Durham | Model of steam boat. |
| Alex. Howden & Co., 50, Lime Street, London, E.C. | Model of steam boat. |
| Mt. Everest Committee | Model of Mount Everest. |
| Thomas Dear & Co., 11, Clive Street, Calcutta | Jute carpets. |
| Khaja Habibulla, Nawab of Dacca | Silver filigree models and ivory mat. |
| East India Tanning Extract Co., Ltd., Raneegunge. | Myrabolam Extract and other tanning materials. |
| Kalimpong Industrial School | Lace and embroidery. |
| Baranagore Widows' Industrial Home .. | Carpets and bead and seed chains. |
| Eastern Bengal Button Manufacturing Co., Dacca. | Mother o' pearl and horn buttons. |
| A. K. Nag | Paintings. |
| Chowgachi Mother o' Pearl Factory, Jessore | Mother o' Pearl pictures. |
| Mrs. Kamini Sundari Pal | Needlework picture of Dr. R. N. Taylor. |
| Pande and Roy Brothers, Hourah | Bamboo root polo balls. |
| Ramsundar Chakrawarti Bisnupur Industrial work. | Wooden handles for instruments. |
| Rai Sahib Bimal Singha | Fretwork wall bracket. |
| A. Sen, Entally | Old and rare shawls. |
| Indo-European Telegraph Co. | Direct telephonic communication with India. |
| Rani Nireepama Devi of Cooch Bihar .. | Needlework picture. |
| J. D. Tripathi, Calcutta | Bhagabat Gita. |

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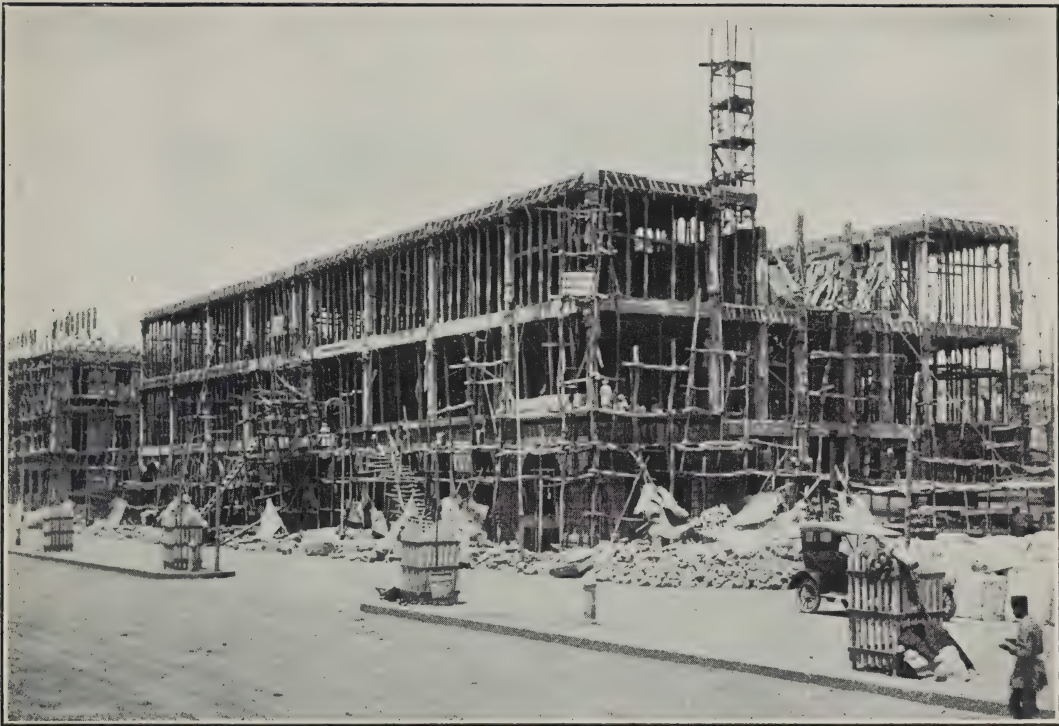
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BEFORE considering the exhibits in detail, it is necessary to obtain some idea of the Presidency of Bombay itself, in some respects the most remarkable of the geographical and administrative divisions into which India is divided.

The Bombay Presidency is a long strip of land from 50 to 300 miles wide, running for over 1,000 miles up the West Coast of India. Including Aden, which is administered from Bombay, it has an area of 187,000 square miles and a population of 26,750,000. The Indian States within this area number 377, most of them minor principalities and chieftainships with a population of nearly 7,500,000, and an area of 63,000 square miles. The British Districts therefore cover about 123,000 square miles, more than twice the area of England and Wales, with a population of 19,250,000.

Bombay is a country of greater contrasts, probably, than any other in India. Its deeply indented coastline, broken into by gulfs and many creeks, yet yields only two harbours of any importance, viz., Bombay in the Presidency proper, and Karachi in Sind.

The province is divided into four distinct geographical divisions—Sind, Gujarat, the Deccan and Karnatic, and the Konkan. Sind, the northern part of the Presidency lying between the hills of Baluchistan and the vast delta of the Indus, is cut off from the rest of the Presidency by the deserts and the sea. The language, the dress and the customs of the people, are very different from the rest of the Presidency. Its climate is amongst the hottest and most variable in India, with a summer temperature rising as high as 125 degrees, and a winter temperature falling to a few degrees below freezing point. Cultivation is only possible with the aid of artificial irrigation, for the rainfall averages only about 8 ins., and the great desert areas are traversible only by camels.

Gujarat is a great and rich plain, watered by the Nerbudda and the Tapti, whose fertility is so marked that it has long been known as the Garden of India. South of Bombay City the Province is divided into two sections by the Western Ghats, a range of hills running for hundreds of miles parallel to the coast. To the east of these hills lies the Deccan, a vast table land with a poor soil and an arid climate, peculiarly susceptible to famine. South of these are the Karnatic districts. Between the Ghats and the sea is the Konkan, a rice growing tract intercepted by creeks which make communication difficult. The rainfall is abundant.

The population varies as markedly as the soil and climate. In Sind Muslims predominate. The people of Gujarat, one of the keenest trading races in the world, have remained true to Hinduism, although long under the dominion of Mohamedan kings. In the Deccan the population is more homogeneous than in Gujarat, and 30 per cent. of the people are Marathas. The Karnatic is the land of the Lingayats, a Hindu reforming sect dating from the twelfth century, while in the Konkan there are many Christians.

More than 20 languages and dialects are spoken, but the four principal ones are Sindhi, Marathi, Gujarati and Kanarese.

The situation of Bombay City on the western seaboard in touch at once with the principal markets of India and the markets of the West, has given the Presidency an immense seaborne trade. The older ports of Surat, Broach, Cambay and Mandvie were famous in ancient days, and seamen from these ports traded to the Persian Gulf and the Coast of Africa. But the opening of the Suez Canal and the increasing size of coasting steamers have tended to concentrate trade in modern ports with deep water anchorages, and the seaborne trade of the Presidency is now concentrated at Bombay and Karachi. The principal industry is agriculture, which supports 64 per cent. of the population. The mineral wealth of the Presidency is small and is confined to building stone, salt extracted from the sea, and a little manganese. Handicrafts still give employment to many. But the tendency, in the East as in the West, is to submerge indigenous handicrafts beneath industry organised on modern lines.

Bombay is the great centre in India of the textile trade, and Bombay City is the Manchester of the East. One hundred and fifty thousand men and women are employed in the mills of the capital town, and Ahmedabad and Sholapur also have many mills. Over 70 per cent. of the export trade of Bombay is made up of cotton, raw or manufactured.

THE EXHIBITS.

The exhibits in the Bombay Court are designed to show within the limits of a space measuring rather under 2,500 square feet, something of the various activities that have given Bombay the commanding position it holds in the Indian Empire. For Bombay is not only an agricultural country—one of the greatest cotton producing areas of the world—but in its capital city of nearly 1,250,000 inhabitants it possesses a great industrial centre and one of the world's largest seaports.

The Court is divided into six exhibiting areas—(1) Greater Bombay, (2) Irrigation, (3) Agriculture, (4) the Indian Room, (5) Arts and Crafts, and (6) Miscellaneous.

The main feature of the Court is an enclosure of 1,100 square feet devoted to exhibits showing the development of Greater Bombay. It is fitting that so large a proportion of the space should be devoted to this, because Bombay City epitomises the growth and the importance of the Presidency as a whole. The participators in this Court are the Development Directorate, the Port Trust, the Improvement Trust and Tata Sons, Ltd., conjointly with the Government of Bombay. The three first-named authorities deal with various phases of the enormous work that is re-making a City, and solving, by different methods, a problem that has found its solution in New York through the medium of the skyscraper.

The Development Directorate shows a model and many photographs and plans illustrating the Back Bay Reclamation scheme, whereby 1,200 acres of valuable land are being reclaimed from the sea.

The Port Trust exhibits a model of the Bombay Docks and of the enormous Cotton Depot, probably the largest of its kind in the world.

The Improvement Trust illustrates, by means of ingeniously constructed models, some of the housing schemes for which it has been responsible.

Tata Sons, Ltd., jointly with the Government of Bombay, illustrate by a large model some of the great hydro-electric schemes which have been developed near Bombay, and which, in a few years, may enable Bombay to claim to be a smokeless city.

Included in the Greater Bombay section are a number of photographs which will enable visitors to get a very good idea of the size, the beauty and the importance of Bombay. A few photographs and plans relating to Karachi, the great seaport of Sind, which handles the wheat traffic of that country and the Punjab, will also be found in the Court.

IRRIGATION.

In the Presidency of Bombay there are already some enormous irrigation schemes either completed or nearing completion. The exhibits in the Bombay Court include, amongst others, a model of the Lloyd Barrage at Sukkur, incomparably the greatest irrigation scheme in the world, for this one work will irrigate an area greater by half a million acres than the whole cultivation of Egypt. Photographs and pictures of the vast Bhandadara Dam, 170 feet high, are also shown.

AGRICULTURE.

More than 64 per cent. of the people of Bombay Presidency are engaged in agriculture, and the exhibits put up by the Agricultural Department illustrate not only the varied products of the country, but the methods of cultivation in use.

INDIAN ROOM.

The magnificent Indian Room (very fully described in a separate pamphlet) has been designed and carried out by the Bombay School of Art, which has been responsible, in the past few years, for a revival of Indian Art, which is attracting attention not only in India but in Western countries.

ARTS AND CRAFTS.

That power industries have not destroyed the ancient handicrafts for which India has for centuries been famous is illustrated by the Arts and Crafts section, and a full description of the exhibits is given in succeeding pages.

MISCELLANEOUS.

The only large private exhibitor is the Indian Woollen Mills, and the products of this enterprise will be found of interest to visitors, for the work turned out by this firm indicates that India will not always be dependent for the finer qualities of woollen goods on imports from abroad.

BOMBAY—PAST AND PRESENT.

Although the East India Company came to India in 1600, its servants were merely leaseholders of factories at Surat and other places on the Western Coast. As early as 1626 an attempt was made to secure a strip of territory free from attack, and an attempt was made to secure a footing on the seven islands of Bombay. But this was frustrated by the Portuguese, and it was not until 1661 that the object was achieved, for in that year Catherine of Braganza brought the Island of Bombay to Charles II as part of her dowry.

Pepys in his diary describes the place as a "poor little island." Certainly the seven islets divided by swamps and marshland, fever ridden and insanitary,

and with a population of under 10,000, did not appear anything to enthuse over. But the men on the spot were well aware of its potentialities, for the Portuguese Governor-General wrote protesting to his Sovereign, "I see the best port your Majesty possesses in India, with which that of Lisbon cannot be compared, is treated as of little value by the Portuguese themselves. The English once there and the island fortified, your Majesty will lose all the North, as they will take away all your Majesty's trade." Amongst the servants of the Company the islands earned an unenviable reputation, and was known as "the charnel house in which two monsoons were the age of man." But reclamation works were started and gradually the seven islands were turned into one by the filling in of the swamps, and communications with the mainland were improved. Commerce was encouraged and developed, with the result that Bombay is now a city with a population of nearly 1,250,000.

Bombay Island is a spit of land running South into the sea. On the east side is the harbour, on the west the Arabian Sea. In shape it is very much like a man's left fist, with the thumb and index finger extended and spread apart. The first is roughly 8 miles long and 3 miles broad. Within the confined space represented by the index finger, 4 miles long, and from a quarter to a mile wide, are the docks, railway termini, and commercial centres. The space between the finger and thumb is a shallow stretch of water known as Back Bay. On the thumb are situated Government House and the fashionable residential areas.

It is this concentration of commerce and population that has caused congestion in the City to become acute, and has given Bombay a problem to solve similar to that which confronted New York when Manhattan Island could no longer supply the demands made upon its space.

IMPROVEMENT TRUST.

The area of the island is 15,066 acres, *i.e.*, nearly 24 square miles, and its population, as ascertained by the census of 1921, was 1,175,914, which gives an all over density of 49,920 per square mile, or about 78 to the acre. This figure of density might suggest that the congestion is not serious, but unfortunately the whole island is not even yet made ready for building operations, and it is towards this work that the energies of the Government of Bombay and the local bodies in the City are directed. In the heart of the town there is a large area where the density of population is nearly 400 to the acre, and here nearly two-fifths of the population reside. Another striking fact is that 66 per cent. of the whole population reside in one-room tenements.

The position now is that whilst the Southern portion of the Southern half of the island contains roads, buildings and open spaces that can bear comparison with the finest laid-out areas of any town in the world, the Northern portion of the Southern half includes many of the most crowded areas to be found anywhere. The Northern half of the island is being opened up on sanitary lines in accordance with the latest principles of town planning.

In the early part of the year 1897, consequent on the outbreak of plague in Bombay, the Government of Bombay took into consideration the question of a comprehensive scheme for the improvement of the City, more especially in respect of the better ventilation of the densely inhabited parts, the removal of insanitary buildings, the prevention of overcrowding, the improvement of communication so as to make outlying lands more easily accessible, and the creation of new building estates laid out and developed on the best up-to-date sanitary lines. The outcome of their deliberations was an Act which created a Board charged with these duties.

The Board consists of 14 trustees. Half the number of trustees are ex-officio, or nominated by Government, and the other half are elected by the Corporation and other public bodies in the City. The Board are independent of the Corporation, but they cannot embark on any scheme until it has been notified to the public and to each individual owner of property affected by it, and has been sanctioned by Government.

WORK OF THE TRUST.

During their 25 years' existence the Improvement Trust has taken up 69 schemes of town improvement and development.

The area of the lands comprised in these schemes is 3,111 acres, or about 20 per cent. of the total area of the City. Accommodation has been provided on the Board's estates for about 125,000 people, whilst 40 miles of roads have been completed. The operations of the Trust are probably the largest of their kind going on in any part of the world.

Beyond building tenements for the poor and working classes, and erecting structures for the City Police, the Trust do not construct buildings for residential purposes. They prepare plots for building purposes and construct roads and drains in connection therewith. The plots are then let on a 99 years' lease, and the ground rents realised form one of the main sources of the Trust's income.

In recent years the energies of the Trust have been directed towards opening up new areas in the Northern half of the island, and huge operations are in progress costing several millions of pounds. The main idea of these schemes is to enable the City to expand, to provide for buildings that can be erected with more space around them, and to attract people to move from the congested areas in the heart of the City. If these schemes continue to attract builders, then the congestion in the City will be automatically relieved. Simultaneously with this new development a main arterial road running from the South to the North of the island is also under construction by the Trust. Its length is over 7 miles, and its breadth ranges from 100 feet at the Southern end to 158 feet in the Northern portion, with a wide central reservation for quick tramway service. This avenue will form one of the finest roadways in the world.

To carry out their programme the Trust employ an adequate staff of officers and servants. At the present time there are 34 officers and 725 subordinates, whilst there are about 12,000 labourers engaged on the several huge works in progress.

The Trust obtains the capital it requires for expenditure by the issue of debenture loans. The loans are either obtained from Government direct or raised in the Bombay market, but two sterling loans have been raised in London. The market value of the Trust debentures stands high, as the law provides that the interest upon them shall be paid by Government in the event of the Board failing to do so. No such contingency has ever arisen. The law also provides for the maintenance of an annual sinking fund for the repayment of the loans on due date, and Government auditors see that this is maintained.

The income of the Trust is mainly derived from the rents of their estates and buildings, from an annual subvention of a definite amount from the City Municipality and from occasional grants made by the Government. It is not a profit-making concern declaring dividends. Profits on schemes are utilised for balancing losses on others, and the balance left over is used for further operations.

An idea of the magnitude of the operations now in progress can be gathered from the fact that during the last four years over £4,750,000 sterling have been expended, whilst the gross annual income is now nearly £500,000 sterling, and will steadily increase as the land now being developed is made into building plots and leased.

The efforts of the Improvement Trust and the Municipality have been unremitting and have accomplished much. But the magnitude of the problem is such that even enterprises on a large scale such as those briefly sketched in preceding pages have not succeeded in keeping pace with the ever increasing congestion. The upheaval of the war was partly responsible for this and among the several problems that confronted Government at the close of the war the Housing question in Bombay was the most important, for the building of houses had not, for various reasons, kept pace with the large increase in population. The famine in houses was felt acutely by the people and had to be countered by such temporary palliatives as Rent control. The real solution lay in providing housing accommodation, particularly for the poorer and middle classes, and soon after the arrival of His Excellency Sir George Lloyd in December 1918, the problem was tackled in earnest. In 1919, it was estimated that of a population of about 1,200,000 nearly 900,000 lived in one-room tenements under most insanitary conditions, and a scheme of a bold and comprehensive character was necessary in order to remove an evil which was becoming a menace not only to the general industrial and financial prosperity of the City, but to the health of its citizens.

A special organisation working directly under the control of Government, with wide powers and large financial resources, was clearly needed. Government accordingly established a Development Department with the following objects :—

- (1) The carrying out of the Back Bay Reclamation Scheme.
- (2) The undertaking of industrial housing schemes.
- (3) The development of the Suburbs.

In order, in the words of the Governor, “ to put the great port and City of Bombay in a position to handle its trade in the cheapest and most efficient manner so as to attract, on account of its cheap facilities, the maximum trade possible ; to provide through this trade an ever increasing quantity of work and wages for its labouring classes, and to secure that all classes and particularly the working classes shall have healthier and happier surroundings.”

In connection with these schemes the Bombay Government floated the first provincial loan issued in India. It met with instant success and over nine crores were subscribed at $6\frac{1}{2}$ per cent.

The Back Bay Reclamation Scheme is probably unique. At a cost of something like £4,750,000, 1,147 acres of land are being won from the sea in the heart of the City's business and residential area. Reclamation has been the breath of life to Bombay and the genius of Engineers has welded what once were seven swampy islands into a solid whole on which has arisen a great City. But the Back Bay Scheme is the most remarkable of them all. Its effect upon Bombay will be much the same as if Hyde Park, Kensington Gardens, the Green Park, St. James's Park, Regents Park and Primrose Hill were thrown open for building, for the land to be reclaimed from Back Bay stands in much the same relative position to the City of Bombay as the open spaces we have mentioned do to London.

But although building land to the extent of nearly 1,200 acres will be available, only 450 acres (about the area of Regents Park and Primrose Hill) will be built upon. For decades Bombay has lacked recreation grounds. The Reclamation will provide them, adjacent to the heart of the City and the sale of the land that is left is expected easily to pay the cost of reclamation and show a profit,

A great wall, four miles long, founded partly on a reef of rocks and partly on a rubble mound is being built out into the sea in a great curve, from the shore at both ends of the area to be reclaimed. The mound is formed by constructing a gantry open at the top, on which wagons loaded with stone are run on rails, shooting their contents into the sea. When the mound reaches the required height it is trimmed off and the concrete wall constructed on top of it. When the wall is complete a great dredger will draw up filling material from the Harbour, on the other side of the island and from Back Bay itself, and pump it through three huge pipe lines 12,000 feet long until the required level is obtained. The rubble for the mound is obtained from a quarry over twenty miles away at Khandivili which turns out 2,000 tons of stone a day. It is calculated that a million tons will be required for the mound alone. The amount of filling in material required is 27 million cubic feet, the equivalent of a mass five miles long, 1,000 yards broad and 9 feet high. The dredger, the largest of its kind in the world, can dredge 2,000 cubic yards of material an hour.

The Industrial Housing Scheme provides for the construction of hundreds of blocks of industrial dwellings, known as Chawls, each containing 80 rooms. The plans provide for a maximum of 50,000 rooms to be completed in eight years.

GREATER BOMBAY.

The Suburban Schemes are intended to provide for the development of the outer ring on proper lines. The existing development of the Suburban areas has been mainly in the hands of private owners who have certainly economised drastically in the matter of expenditure on roads and permanent open spaces. The result is shown by detached clusters of houses, built to no regular alignment and to no set plan, the houses lying closely one behind the other and approached in the majority of cases by narrow lanes or mere foot-paths. Often the owners of the interior plots are unable to build for want of access to their buildings and, since the essential preliminary to the provision of such amenities as water supply and drainage must be the construction of a system of roads giving access to every building plot the only remedy lies in a town planning scheme, and the Development Department is dealing with schemes totalling tens of thousands of acres. It is not the policy of the Directorate necessarily to acquire all land in such schemes and owners who wish to retain land are being allowed to do so, provided they agree to build in accordance with rules laid down by the Directorate and to pay a reasonable contribution, in land or in cash, towards the cost of the development.

The magnitude of the programme that has been undertaken may be gathered if the population which the several schemes will accommodate is taken as the basis.

A conservative estimate shows the following figures :—

| Scheme. | Population Provided For. |
|---|--------------------------|
| Back Bay and East Colaba Reclamations | 50,000 |
| Housing Scheme of 50,000 tenements | 250,000 |
| Suburban Schemes | 300,000 |
| Total | 600,000 |

These are astounding figures, a world record we imagine, for they mean the reshuffling of half the population of the City of Bombay, the provision of homes for as many people as they are in Sheffield to-day. The cost will amount to something like £20,000,000. But it will enable the Improvement Trust to take in hand the demolition of the foetid slums of the City—impossible now when there is no place for the dishoused people to go—and the driving of those great arterial roads of which the City stands so much in need.

A corollary to the great development schemes described in preceding pages has been the increase in the water supply of the City. Until 1866 the water supply of the City was from wells only. Since then no fewer than four lakes have been constructed outside Municipal limits and connected with the City by means of pipes. The largest of these lakes is Tansa which contains 35,000 million gallons of water at the end of rainy season. It is already connected with the City by a system of aqueducts and two 48 inch pipes. Two more steel pipes of 72 inch diameter are now being laid for a distance of some 50 miles. A contract for this was let in 1912 to Messrs. Braithwaites & Co. The steel plates for the pipes, of which some 80,000 tons will be required, are supplied by Messrs. Dorman, Long & Co. from their Redcar (Middlesbrough) Works, and are being bent and fabricated into pipes at Messrs. Braithwaites' Works at Mulund near Bombay. It is believed that they will constitute the largest steel pipe line in the world. The cost of the water supply works already in progress is about $5\frac{1}{4}$ crores of rupees, that is, £3,500,000 sterling. At present the water supply is nearly 40 gallons per head. The new works will be completed during 1925 and the water supply will then be about 90 gallons per head of the City's population.

BOMBAY'S RAILWAYS.

In the processes of development that have been going on in Bombay for the past fifty years the railways have of course, played an important part. They are destined to play an even greater part because upon their efforts depend the success or failure of the "Greater Bombay" idea.

The development of the residential areas within the ten mile radius of London would have been impossible but for the Railways. The trains and the 'buses followed after, when the areas had been fully or partially developed.

In Bombay to-day progress is retarded until the Railways can cope with the traffic, especially during the rush hours, that suburban expansion will bring. But both railways are working hard to extend and remodel existing facilities and the secret of their success is electrification.

Bombay is the starting point of two of the great trunk railways of India, the Great Indian Peninsula and the Bombay, Baroda and Central India. The G.I.P. has a mileage of 3,335, nearly as extensive as that of the Great Western Railway group. The B.B. & C.I. mileage is nearly 1,300.

The Victoria Terminus of the G.I.P. Railway is one of the finest stations in the world. For 33 miles out of Bombay as far as Kalyan the tract is quadrupled, but the traffic on those lines is so great that an expansion of the suburban train service is impossible with steam trains. And here it should be noted that the suburban problem of Bombay is more difficult of solution than that of London, even taking into account the difference in population, roughly as one to four. From London the railways radiate to all points of the compass. The stream of traffic during the rush hours pours out into the suburbs from a dozen great main line stations, North, South, East, and West, on both the banks of the river.

From Bombay, suburban traffic can only go one way, and that is North. It is not until well beyond the suburban limit that the direction changes materially and the lines spread out to the East and South. The main portion of the island of Bombay is eight miles long by three miles broad.

The G.I.P. is indeed developing its Harbour branch railway which runs South-East from the main line at Kurla into the heart of the City, and this line when the Eastern side of the island is developed will carry a traffic approximately equal in density to that of the London Suburb Lines. But the general direction of all traffic is North.

As far back as 1904 the question of operating the suburban services of this railway by electric traction came into consideration. Government sanction has now been accorded for the electrification of the following sections of the suburban area, work has been commenced on the Harbour branch and Bombay Kurla sections and contracts have already been placed for part of the electrical equipment necessary.

Section (1).—The Harbour Branch Lines from Bombay to Kurla and the Mahim Chord linking the Harbour Branch with the B.B. & C.I. Railway at Mahim. This branch is at present in use only for passenger traffic between Kurla Junction and Reay Road and between Bandra and the Sewri Cotton Green, but construction has been continued to join the main line about $1\frac{1}{2}$ miles North of the Victoria Terminus. There, in conjunction with extensive remodelling work in progress between Mazagaon and the Victoria Terminus, six lines will be available, two being reserved for Harbour branch trains. Apart from the traffic, due to its contiguity to the Bombay Port Trust lines and the fact that it passes through the Dock District, this branch is expected to carry a great deal of additional traffic, owing to the transfer of the Cotton Green from Colaba to Sewri; also the grain, oil, and timber depots, etc., not to mention the traffic resulting from the development of Kurla District for residential purposes, as a result of the operations of the Bombay Development Directorate. It is hoped an electric service will start running on this section in January, 1925.

Section (2).—*The local passenger service between Victoria Terminus and Thana.*—Electric operation on this section will commence shortly after that of the Harbour branch, probably in 1926.

Section (3).—The local passenger service between Thana and Kalyan is also to be electrified and will be brought into use about the same time as the Victoria Terminus and Thana sections.

The supply of power for the suburban services will be taken from the Tata Hydro-Electric Power Station.

As an indication of the volume of traffic dealt with on these lines, it is anticipated that in five years' time the daily number of passengers to be conveyed will be about 75,000, of which 16,500 will be concentrated in each two-hour "rush" period, and calling for some ten trains per hour at such times, while in 15 years hence these figures will be doubled. The proposed enlargement of the Victoria Terminus will increase the number of platforms from seven to twelve, it being intended that suburban traffic shall be concentrated at six platforms, two reserved for trains serving the Harbour Branch, and entirely separated from through and long-distance traffic.

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

This is the other railway which connects the town and seaport of Bombay with the rest of India. Its local service serves the Western side of the islands of Bombay and Salsette, and extends from Colaba, at the extreme South of the island, to Virar ($38\frac{1}{2}$ miles) on the mainland. The pressure on this local service has greatly increased in recent years, and the local lines are at present carrying 45,000,000 of passengers every year, or 70 per cent. of the total number of passengers travelling on the broad gauge system.

This increase and future developments are being met (1) by quadrupling the tracks on the local section, and (2) by electrification. Two tracks will be electrified, and each train will carry 1,000 passengers. A new terminal station is being built on a site 47 acres in extent.

THE PORT OF BOMBAY.

Eleven miles long, from four to six miles broad, the Harbour of Bombay, while it does not seek to compete in size or beauty with Rio or Sydney, is one of the finest harbours east of the Suez. Well protected from the monsoon, it lies between the island of Bombay and the mainland, where the towering heights of the Western ghats seem almost to touch the shore. On the Western side the land is undeveloped, a quiet agricultural district, as remote from industrialism as the depths of the Deccan. It is on the Eastern side, on the island of Bombay, only a few miles across the water, that the docks are situated, the mills and the factories and the great railways that feed the docks with the exports of the Presidency and Central and Northern India and carry away the enormous import trade.

The joining up of the islands before described, and the large reclamations carried out, were largely the work of private individuals, to whom the submerged lands were granted in perpetuity, on condition that they were drained and reclaimed. The enormous increase in the extent of the developments carried out by private Companies resulted in the Government deciding in 1869 to buy up the private rights and put the control of the estates, and the power to levy dues, in the hands of a Board of Trustees, which was duly formed and took control in 1873. The whole administration of the Harbour, lighting, pilotage, docks, bunkers, railways and landed estate, is now carried out under this Board which consists of a Chairman and twenty members.

In 1873, when the Trust was first instituted, there was only one small enclosed dock, the Sassoon dock, at Colaba and the first big work undertaken was the construction of the Prince's Dock which was commenced in 1875. The foundation stone was laid by H.M. King Edward VII, then H.R.H. the Prince of Wales, on November 11th of that year.

The Prince's Dock has a water area of 30 acres and provides seven berths for vessels over 400 feet in length and five berths for smaller ships, including two oil fuel berths with a pipe line connection to the oil installations.

The Victoria Dock, situated immediately South of the Prince's Dock, can accommodate thirteen vessels of 400 feet length and one of not more than 350 feet length.

All berths are provided with transit sheds.

The foundation stone of the third and largest dock in Bombay, the Alexandra Dock, was laid in 1905, by His Majesty King George V, then Prince of Wales, and the dock was opened on March 21st, 1914, by His Excellency Lord Hardinge, Viceroy of India.

This great Dock, which is to the South of the Prince's and Victoria Docks, has a water area of 49.63 acres and provides accommodation for seventeen vessels of 520 feet each, there being also a berth 425 feet long at the jetty end.

The entrance lock is 750 feet long and 100 feet wide, the depth of water over the entrance Sill at H.W.O.S.T. being 41 feet 3 inches. The berths are provided with transit sheds of either two or three storeys. All have up-to-date railway communication. The floor area of the transit sheds is over 1,175,000 square feet.

All the docks have adequate crane equipment from the huge 100 ton crane and the 60-ton floating crane downwards.

The wall on the West side of the entrance lock is extended for a distance of 1,500 feet, and forms the Ballard Pier Station, at which the largest steamers can lie alongside to embark and disembark passengers and mails; on this pier is the railway station, with direct rail communication to all the railway systems in India.

The railway station consists of three platforms for the mail trains, a large "concourse," with refreshment rooms above, and a hall for dealing with passengers' baggage and Customs, 377 feet long by 66 feet broad. Above this

hall is accommodation for Postal department, where the mails are sorted and distributed. It may be added that the clearing of passengers' baggage is done with a rapidity much appreciated by East-bound passengers after the archaic methods of Tilbury.

There are two dry docks capable of taking big ships. All these docks are situated on land which has been reclaimed from the sea. Four hundred and eighty three acres have been raised and made useful as well as 157 acres of swamp.

The Port Trust own numerous warehouses for the storage of the merchandise which is most regularly imported. These warehouses are connected with the docks by means of bridges, but are situated outside the dock walls. The stocks stored in these warehouses usually amount to about 95,000 packages.

THE RAILWAY AND DEPOTS.

Until recently, practically all the merchandise imported or exported at Bombay, was handled by bullock carts, and in order to cheapen the handling of goods, the Port Trustees decided to construct their own railway, taking over all traffic for the harbour from the two railway companies at a point about six miles North of the docks.

The Port Trust Railway has over 100 miles of single line, and consists of an up-to-date gravity Sorting Yard, large depots for grain, cotton, manganese, coal, etc., and the sidings within the dock areas.

Immediately south of the Wadala Yard, are the bulk Storage tanks of the great oil and petroleum companies. Each installation is connected to the railway and has siding accommodation, and the tanks are filled from steamers by means of a pipe line from the docks. The petrol tanks are filled by a special pipe line from the new petrol pier at Pir Pau, which is situated at the head of the harbour on the island of Trombay.

South of the Oil depots, the railway passes through and spreads over the Mazgaon Sewri Reclamation, an area of 583 acres reclaimed by pumping from the harbour. On this area are situated the following depots :—

The Grain Depot, the Cotton Depot, the Manganese Depot, the Iron Import Depot, the G.I.P. and B.B. & C.I. Railway Stores Yards and the Government Telegraph Stores Yard.

There are six large sheds 1,000 feet long by 110 feet broad and seven smaller ones 500 feet long, the latter being served by two inward and two outward sidings. Each siding holds ten wagons.

The Cotton Depot, probably the largest depot of its kind in the world, provides covered accommodation for 1,335,000 bales of cotton and uncovered accommodation for one million more.

The depot covers an area of over 432,000 square yards and is situated on the west side of the Port Trust Railway main lines and immediately opposite to the grain depot.

There are sixteen station platforms in echelon each 250 feet long, with a high level station near the central main road, connecting direct with the Great Indian Peninsula Railway to Victoria Terminus, and giving cotton merchants a fast and frequent service of trains to and from the business centre of Bombay.

The covered accommodation for cotton consists of ferro-concrete buildings each 104 feet by 40 feet with a maximum capacity of 7,500 bales piled 18 tiers high. Each building is fitted with automatic sprinklers, in case of fire.

The cost of the Depot was £1,135,000.

The length of railway track immediately serving the cotton depot platforms amounts to seven miles of single line.

The new Manganese Ore Depot has an area sufficient for stacking over 160,000 tons of manganese ore and is served by four miles of railway track.



A peep into the Indian Room decorated by the pupils of the Sir J. J. School of Arts, Bombay.



A glimpse of the Agricultural Exhibits.



A quaint device for pumping water.



A typical Kharia (water course) taking off from an inundation canal.



On the backwaters.



On a wayside at the approaches of Bombay.



Near the Ghats.



Bird's-eye view of the Bombay reclamation scheme.



A typical Dam. Note the beautiful surroundings.



A field of Turmeric, from the roots of which curry powder is made, grown on the banks of irrigation canals.



Bales of Cotton



Arts and Crafts Show



the Docks.



Bombay Court.



At the Art Gallery. Note the fine decorative frieze and specimens of carving.



Mill Bazaar before improvement.



Mill Bazaar after improvement.



At one of the new piers.



Near Bombay.



A Maize Field, with the watchman.



Pipes that supply water to Bombay.



Large extensions to the dock accommodation are being considered by the trustees, and a large new dock is contemplated, which will probably be situated in the vicinity of Trombay at the head of the harbour.

A source of wonder to all visitors to the Port Trust offices is the large tidal model of the harbour which has been constructed for experiments. This model, probably the largest in existence, is a reproduction in concrete of the islands, coast lines and harbours bed. The horizontal scale is ten inches to a sea mile, with a vertical scale of $\frac{1}{2}$ inch to one foot.

The harbour bed of the model is covered with a two-inch layer of the finest sand, and the tidal propagating machinery driven by a 5 h.p. electric motor, produces a regular rotation of graduated spring and neap tides, analogous to those actually occurring in nature.

So far as the preliminary experiments have gone, the model has given results which agree remarkably well with the observations taken recently in connection with the survey of the harbour.

A SMOKELESS CITY

THE TATA HYDRO-ELECTRIC WORKS.

EVERY big Industrial Town needs large sources of power to carry on its factories and mills. Bombay, the beautiful capital of Western India, is not only an Industrial Town, but a great Seaport as well. The coal needed by it can only be brought from overseas or from the other side of the country, for the best and largest deposits of coal in India are to be found in Bengal, some 1,500 miles away.

But the ingenuity of man has been able to offer to this town the substitution of a much cheaper source of power by utilising the natural advantages due to her situation on the West Coast of India. The great Deccan Plateau occupies the centre of Southern India, and is bounded on the West, from Mount Abu to the Nilgiri Hills, by the chain of the Western Ghats, which run parallel to the coastline about 30 miles inland, towering up to an almost vertical height of 2,000 feet.

With the commencement of the South-West Monsoon, large currents of air, heavily laden with moisture, from the evaporation of the waters of the Indian Ocean, are borne against this natural wall. They are wafted aloft almost vertically to the plateau above. The sudden change of temperature causes the moisture-laden atmosphere to condense, and as it surmounts and crosses this great natural barrier, it bursts into torrential rains which, along the crest of the Western Ghats, average about 200 inches within the Monsoon months from June to September.

These Ghats are broken in two places sufficiently to permit the Main Railway Lines from Bombay to cross over to the Deccan Plateau, at Igatpuri and Lonavla. The latter is a pleasant hill station near Bombay, where, towards the end of the nineteenth century, one Mr. Gostling, a well-known architect and engineer of that City, spent much of his time during the hot season, and in his rambles came upon the valleys at the edge of the Ghats, which, being almost surrounded by hills, could easily be enclosed by dams at one end to form enormous reservoirs. Science had sufficiently developed meanwhile to enable man in other parts of the world to utilise large natural falls of water from a great height for the production of electrical energy on a large scale. India's pioneer industrialist, Mr. J. N. Tata, at once realised the great possibilities of Mr. Gostling's discoveries, and Bombay's growing need for sources of power encouraged him to call in the aid of experts in hydro-electric works.

The engineers designed three dams, the first at Lonavla to increase the

storage capacity of the original lake, the second in the Walwhan Valley (about a mile long and 60 feet high), and the third to form the Shirwata Lake, which is connected with the Walwhan Lake by a tunnel 5,000 feet long through the intervening hill. The lakes at Walwhan and Lonavla are interconnected with the Forebay by canals about five miles long, which carry water at a gradual slope to the edge of the Ghats, where they enter large steel pipes laid down the slopes of the Ghats to the power house at Khopoli, 1,740 feet in the plains below.

Some idea of the magnitude of the hydraulic work above the Ghats may be gathered from the fact that the amount of masonry in the Shirwata Dam alone would be sufficient to build a wall 2 feet thick by 6 feet high for 284 miles, which is greater than the distance from London to Carlisle. In fact, the total masonry in the whole of the hydraulic works, including the dams, ducts and other works, would build a wall 2 feet thick by 6 feet high from London to Dundee or from Bombay to Nagpur.

The water, as it enters the large steel pipes, remains enclosed from the Forebay down to the power house, so that the pressure at the end of the pipe line, which is practically equal to the weight of a column of water of that height, amounts to 743 lbs. per square inch. The jet of water from each pipe line strikes with this tremendous force, one after the other, the numerous buckets on the enormous steel Pelton Water Wheels, and turns them at a speed of 300 revolutions per minute. Each of the five Pelton wheels in the power house is in turn directly coupled to large generators capable of generating 10,000 h.p. each. The power house is thus capable at full load of generating 50,000 h.p. The water, after it has exhausted its energy in turning the water wheels, is released into what is called a tail-race, which flows into a neighbouring stream. The amount of water flowing into this stream when all the five generators are working would be two-thirds the volume of the River Thames.

The power house being 60 miles away from Bombay, this current, which is produced at 5,000 volts, is transformed to 110,000 volts to economise the cost of its transmission to Bombay. The whole of this current is conveyed to Bombay along two transmission lines of three copper cables each, supported on specially designed steel towers. In Bombay it is reduced again to a lower voltage at the Parel Receiving Station for distribution to the various consumers of the Company, and the energy thus available helps to run 35 of the largest cotton mills of the City, and also contributes towards its lighting and tram traction. The whole of the distribution in the City is done by underground cables at 6,000 volts. Each consumer has a small station, where the current is again reduced to 2,200 volts for working the motors that drive the machinery in the factory. The power thus delivered costs the consumers very much less than that available from coal, and the success of the scheme has been demonstrated so completely that two other schemes, each larger than the preceding one, have been undertaken.

The holding up of the waters in the Andhra Valley by a dam 190 feet high has made another 60,000 h.p. available for the electrification of about 45 more factories in Bombay.

Still another scheme in the neighbouring valley of the Nila Mula River will produce another 150,000 h.p. The dam required in the third scheme at the date of its completion will probably be the largest dam in the world for the quantity of masonry required in its construction. The power available will be sufficient to electrify all the remaining factories in the City of Bombay, to take over the whole of the tramways and lighting load of that City, and to run railways along each of the two main trunk lines both ways for about a 100 miles from Bombay.

The above is but a bare outline of these gigantic works. One needs to examine any portion of them in detail to realise how patient labour, great

ingenuity and the highest skill, have combined in their production. For instance, where the transmission line crosses the two large navigable creeks, the towers in the centre have to be raised to a height about 180 feet, so as to allow free navigation below the wires. Difficult as it has been to construct these enormous towers in the middle of a tidal creek, it may be imagined what nerve and devotion to duty is required efficiently to maintain the lines when one considers that repairs have often to be carried out at the top of these lofty towers on one transmission line, while the other on the same tower is still charged at 100,000 volts. To come within 6 feet of any one of its conductors would mean instantaneous death.

It may be claimed for Bombay that in this scheme it has the first large hydro-electric works in the world to utilise an artificially created head of water.

Human intelligence and ability have added to the resources of India by taking advantage of climatic and physical conditions. The vast store of energy gathered by the heat of the sun's rays acting on the waters of the ocean, and preserved in the clouds, is carried inland by the Monsoon winds to the Ghats, where it is brought to earth in torrential rains on the edge of the Deccan Plateau, thus enabling the storage of large lakes of water at great heights, and such store of potential energy is in turn tapped from time to time as required to meet the industrial needs of Bombay by leading it over the Ghats in high pressure pipes, which confine the latent energy till it is expended in the turning of the water wheels of Khopoli. The water, having done its work, goes back to join the ocean whence it came, having yielded to man a substitute for 160,000 tons of coal per year. The present scheme alone saves, therefore, so much coal, and releases 8,000 wagons in a year on the railways for other national needs. Hydro-electric resources are rightly referred to as the white coal of a nation. With this important difference that it produces no dirt and no smoke, and in a few years Bombay, with all its industries run by electric power, may claim to be the only smokeless city in the world.

IRRIGATION.

The liability of the Deccan plains to famine owing to the nature of the Monsoon rains has long been a cause of anxiety to the administration of the Province, and millions of pounds have had to be spent in famine relief since the British occupation. The only remedy is irrigation, and hundreds of square miles have been rendered safe from famine by the construction of canals. The work is still going on, and in the Bombay Presidency irrigation works on an enormous scale are approaching completion.

The paintings in this section of the Bombay Court illustrate an irrigation work in the Bombay Presidency, which will protect from famine an area three times as big as Greater London. The south-west monsoon, after sweeping across the Arabian Sea, deposits annually an unfailing supply of 250 inches of rainfall on the hills known as the Western Ghats during the months of June to September. While this heavy rainfall on the mountain barrier of the Ghats is assured, the clouds frequently pass over the plains to the east of the Ghats, known as the Deccan, without depositing any rain. Rainfall there is so uncertain that it has been said, "The Deccan expects a famine one year in three—and gets it." Actually it is not so bad as that, but in four years out of five there is at least partial failure of crops owing to scanty rainfall.

The Scheme shown in these paintings is typical of many which are either projected or already constructed in the Bombay Deccan in order to conserve the monsoon rain and distribute it where it is most needed. It provides for the formation of an artificial reservoir in the valley of the Pravara River by means of a masonry dam. This river is replenished annually by the monsoon rainfall, and the stored water is let out into canals during the remaining eight dry months of the year.

The dam, known as the Bhandardara Dam, which is shown in the other picture, is one of the highest masonry dams in the world. It is 270 feet high, or nearly twice as high as the Nelson monument is Trafalgar Square. The lake, or reservoir, covers an area of six square miles, and impounds 11,000 million cubic feet of water, which can be increased subsequently to 13,000 million cubic feet by the addition of gates to the Waste Weir. The water leaves the reservoir through eight pipes of 36-inch diameter, arranged in sets of two, spaced at 50 feet vertical intervals, and flows down the natural bed of the Pravara River till it is arrested 53 miles downstream by a weir which diverts the water into two canals, one on each side of the river. The Left Bank Canal is 48 miles long, or nearly as long as Panama Canal, and the Right Bank Canal is 33 miles long, or only two miles shorter than the Manchester Ship Canal. The total area protected by these canals is 200,000 acres, and approximately *one-third* of this area will eventually be irrigated annually. The total cost of the scheme is Rs. 151 lakhs (£1,000,000 about), and a net return of 5 per cent. is anticipated on this outlay.

THE BIGGEST SCHEME IN THE WORLD.

For nearly 80 years the problem of how best to develop the irrigation of Sind has exercised the minds of the engineers and administrators of the Bombay Presidency. Schemes have been produced, discussed and discarded, and Sind has had to depend for its agricultural welfare upon perennial canals dependent for their supply upon the fluctuations of the Great River Indus. Up to now cultivation has been a pure gamble against the river. The soil is rich, the climate regular and suited to the crops, but without a certain supply of water these natural advantages are of little account. Last year saw the inauguration of the greatest irrigation scheme in the world, designed to settle the problem once and for all, and to assure to the vast areas of fertile land in Sind a regular and constant supply of water.

The Province is about 350 miles long and from 120 to 250 miles wide. It has a total area of about 47,000 square miles, or slightly less than the area of England. Of this some 23,500 square miles consist of culturable soil. Its population of 3,280,000 is almost entirely dependent on agriculture for its existence. Yet the present annual cultivation in Sind is rather less than 3,500,000 acres. There is no rain to speak of, and the crops depend on artificial irrigation.

BUILDING ON SAND.

Many years ago it was believed that it was literally, as well as metaphorically, true that a house built upon sand could not endure, and the engineers of the last century were faced with the problem of finding on the Indus a site for a dam that would give a rock foundation and yet be free from other defects, among which may be mentioned the possibility of causing the river to change its course. But to-day engineers have proved that it is possible to build upon sand, and the great barrage will, in fact, be founded upon that material. This huge dam is the keystone of the whole vast project. Nearly a mile in length, pierced with 66 openings between which huge 50-ton steel gates will operate to control the flow of the river, it will ensure that the huge network of canals and distributaries thousands of miles in length will obtain a certain supply of water. On a bed of fine sand and silt near the town of Sukkur will be laid down a solid masonry floor, and on this will be erected the superstructure of the barrage, built of white lime stone, massive but elegant, as the illustration shows. The barrage will carry two high level and low level bridges, each just under a mile long, the lower of which will be opened night and day for the use of the public, and will supply a long-felt want for uninterrupted traffic across the river. It will be the first road bridge over the River Indus south of Attock, 600 miles upstream on the Frontier.

THE SEVEN GREAT CANALS.

On each bank of the river immediately above the barrage the seven great canals will take off and distribute the waters of the Indus over an area of some 8,000,000 acres, a tract as large as Wales, at present mostly desert, which, in the years to come, will be one of the granaries of the world.

Of the three great canals which will carry off on the right bank the waters of the Indus, two are wider than the Suez Canal, while the third, though of infantile dimensions compared with these, will yet, for all its puny size, cover a total length of 140 miles, with 30 miles of branches and 294 miles of distributaries, to supply an area of cultivation slightly larger than the whole area of the County of Surrey. The Rohri Canal on the left bank will be at ground level nearly half as broad again as the Suez Canal; the total length of the canal itself, its branches and distributaries, will be 2,508 miles; its main drainage channels alone will cover nearly 400 miles. The other system on the left bank involves the building of one supply channel more than double the width of the Manchester Ship Canal, the canalising of 242 miles of an existing river, and the supplying of water for the cultivation of an area equal in size to the whole of Devonshire. The quantity of water which will thus be distributed for purposes of cultivation is too vast to attempt any adequate description of it. But, perhaps, one may get some idea of its volume when it is realised that one alone of the canals on the right bank will have a discharge of water which falls not far short of the maximum discharge of the River Thames.

The South Eastern Canal will cost 150 lakhs, and irrigate some 500,000 acres of cultivation.

To come to the barrage itself. This mighty structure, the largest of its kind in the whole world, will cost nearly a million pounds more than did that world-famous structure, the Assouan Dam. It will be known as the Lloyd Barrage, after Sir George Lloyd, Governor of Bombay from 1918 to 1923.

SUMMARY OF THE SCHEME.

Summarised, the Sukkar Barrage and Canals project will provide sufficient water for the eventual cultivation of the following areas in British and Khairpur State territories:—

823,000 acres of rice.

1,739,000 acres of cotton, jowari, etc.

3,338,000 acres of wheat, oil seeds, etc., or nearly 6,000,000 acres of cultivation annually. The total cultivation in the whole of Egypt is only 5,400,000 acres.

Not only is this scheme vital to the future of Sind and of indirect benefit to the whole of India, but it is expected to be a sound commercial proposition. The whole of the money is being found by the Government of Bombay, and the final capital cost of the scheme will be 1,836 lakhs of rupees (£12,500,000), and the final net annual return 14·6 per cent., or a net profit to Government, after paying all interest charges, of 8·6 per cent. on the capital outlay, or a net annual surplus of 158 lakhs (over £1,000,000).

THE ENGINEERING PROBLEM.

In the actual construction of the Canals of this great Project there is the enormous quantity of ten thousand million cubic feet of earth excavation to be carried out which is equivalent to four complete Suez canals, or almost exactly one hundred Great Pyramids, and in order to complete this quantity in, say, 10 years, it would be necessary to employ continuously as many as 60,000 labourers. If in addition to this number, one adds the people who will be required to build the Barrage and for all the infinity of Masonry Structures

and allied operations throughout all the Canals, it will be found that the continuous employment of at least one hundred thousand labourers would be required. This enormous figure is outside the consideration of practical politics, but it is possible to procure machines which will serve all purposes, *i.e.*, they will save labour to a startling extent, they will excavate efficiently to the requirements and at great speed, and they will do the work at a price with which manual labour cannot complete.

GIANT EXCAVATORS.

Some of the machines used for the Sukkur Schemes will be the largest in the world. They will weigh over 300 tons and will be equipped with a boom 155 feet long which will excavate in one scoop a quantity of five cubic yards—roughly six tons in weight.

They will work in pairs, and even with a pair of such enormous contrivances it will take $6\frac{1}{2}$ years to complete the excavation of the first 38 miles of one of the Canals, for instance—the Rohri Canal. In order to increase the possible output of these wonderful machines as the Canals become narrower in width, it is devised to shorten the boom and increase the size of the bucket. It is possible to use the same power machine and equip a 143 feet long boom and a six cubic yard bucket which represents $7\frac{1}{2}$ tons of earth and every scoop still shorter 120 feet boom and a still larger 8 cubic yard bucket may be used which means over $9\frac{1}{2}$ tons of earth in each operation.

It is computed that in one single day the large machine working 16 hours will excavate 120,000 cubic feet. This may be taken to represent the equivalent power of 1,500 labourers, and the total crew—including all men engaged on supplies of materials, water, fuel,—will not exceed 60 souls all told.

It may, therefore, be stated that for every 1,500 labourers who would be required for hand-labour excavation, it will be possible to do the equivalent work with sixty men—plus one machine.

It is hoped that by June, 1930, it will be possible to hang the giant gates of the Barrage into position and from that moment onwards regulate the waters of the Indus to suit the requirements of the seven new canal systems.

The river at Sukkur, at present only disturbed by occasional local craft, will within two years from now be a hive of industry. Suction dredgers, paddle wheel steamers, launches and tugs, to say nothing of numerous barges and pontoons will dot the surface of the river in the neighbourhood of the Barrage.

SUMMARY OF A GREAT PROJECT.

The Barrage will command an area of 8,000,000 acres. The land actually irrigated by the canals will be 6,000,000 acres or 600,000 acres more than the total area of cultivation in the whole of Egypt.

The Barrage will cost over £3,500,000 sterling, or £1,000,000 more than the Assuan Dam. It will carry two mighty Bridges across the Indus, each of them nearly five times as long as London Bridge. The Dam will be pierced by 66 openings each of 60 feet span between which huge steel gates will operate.

There will be seven large canals, three of them wider than the Suez Canal.

The Rohri Canal, the biggest, will be over 205 miles long with 2,300 miles of branches and distributaries.

The Central Rice Canal will have a discharge equal to that of the Thames.

The Excavation work to be done on the canals is equivalent to Four Suez Canals or 100 Great Pyramids.

The irrigated lands will produce an annual crop of two million tons of grain and cotton.

The complete scheme of Barrage and Canals is estimated to cost over £12,000,000 sterling.

AGRICULTURE.

The description of the great Sea Port City of Bombay given in proceeding chapters might convey the impression that the Presidency of Bombay is mainly concerned with industry. It is not. Bombay is largely an agricultural province; 64 per cent. of the population is supported by pasture and agriculture; 79 per cent. of the population resides in villages of less than 500 inhabitants—the term village really represents what would be known as parish in England. Of the 26,700 towns and villages in the Presidency, 16,788 contain under 500 inhabitants. There are only nine towns with a population of 50,000 and over.

There are in the Presidency and Sind 42,000,000 acres of cultivated land. Three-fourths of this are devoted to growing foodstuffs, the outturn being about 5,250,000 tons. There are 3,000,000 acres under cotton.

From these figures it will be seen that the Bombay Presidency is a great agricultural province and the Bombay Court therefore contains a representative agricultural exhibit.

This has been prepared under the direction of the Agricultural Department of Government which has done and is doing splendid work in improving the quality and increasing the yield of the various crops from throughout the country.

A detailed description is not given here, as each exhibit is clearly labelled with an adequate explanation. It will be sufficient to draw attention to those of particular interest to non-Indian visitors.

Exhibits 1-27 deal with animal husbandry and dairying. The models of the best types of milch cattle will be found of interest as they are of a very different type to those seen in England, and may appear to suffer in comparison with the Jersey, Ayrshire and other breeds. But it must be remembered that in India many breeds have to serve a dual purpose of milk and draught. The bullock cart is the universal method of transport away from the railway, and even in Bombay City this slow uneconomic method of transport still holds its own with motor lorries.

The Gujarat buffalo with its dirty grey hide and huge horns is an even uglier animal in real life than the model depicts him. But as a producer of rich milk the buffalo is an asset of importance to the people of Bombay.

Exhibit No. 12 is interesting as it shows the method of preparing prickly pear for cattle fodder, a process that has saved thousands of cattle in times of famine.

Exhibits 28-44 illustrate the various varieties of oil seeds which form a very important crop, especially for the export trade. The ground nuts, or monkey nuts, are produced one to five inches below the surface of the soil. They give an oil percentage of from 47 to 50 per cent., and the stalks of the plant are used as a rich fodder. Cultivators of this crop suffer from the attentions of wild pig who relish the ground nut as their brothers in France relish truffles. Unfortunately the wild pig of Bombay lacks the training of the pigs of Perigord and the crop suffers in consequence. Safflower and sesamum are other important oil producers.

Exhibits 45 to 48 show the various forms in which country grown tobacco is used for smoking, chewing or snuff. A "general utility" product is No. 59, the cashew nut, which grows wild near the sea coast. The bark and the pericarp yield oil which is employed to tan fishing nets, the juice from the bark makes an indelible marking ink, two kinds of oil are obtained from the nut itself and its shell, which also yields a spirit. Baked-cashew nuts are an excellent substitute for almonds at the dinner table. Cardamom (No. 60) is one of the highly prized aromatic spices for which India has been famous since the earliest times.

Nos. 63-69 show specimens of the sugar cane, its cultivation and conversion into raw sugar (gul), the chief sweetening medium used by the mass of the people of the Presidency.

The cocoanut, that wonderful "universal provider," is illustrated in Exhibit 70, and it is difficult to exaggerate its importance to the people of Bombay. It is a tree every part of which serves some useful purpose. The nut itself yields an edible oil which is used also as a luminant and a shampoo or hair dressing by Indian men and women. Ropes are made from the shell fibre, and the huge leaves eight to ten feet long are used for thatching roofs.

The betel nut (No. 75-79) is obtained from a palm tree similar to the cocoanut. It is universally used for chewing either alone or with a mixture of betel leaves-pan, lime, cardamoms, etc., as the purse of the user allows. Every street in Bombay bears visible signs of the betel nut habit and the bright red fluid it produces. The presentation of pan supari (betel nut rolled in leaves) is an integral part of every Hindu Social Ceremony.

Exhibits 82-94 deal with Bajri (spiked millet) jowar (great millet) and rice, all important food crops in the Bombay Presidency.

Some of the many implements of cultivation, ancient and modern—but mostly ancient—used in the Presidency are illustrated in Exhibits 95-140. The Agricultural Department is making great efforts to introduce improved implements and is meeting with a fair amount of success. But the Indian ryot is extremely conservative and progress is necessarily slow. Moreover, any implement must be capable of being repaired by the village blacksmith. Complicated machinery is useless to the mass of the cultivators. There are a certain number of landholders who could make use of modern machinery, motor tractors and the like. But the latter are only economical when used on a large scale and the cultivated area of the Presidency is for the most part split up into scattered holdings.

The Horticultural section (Nos. 106-139) will be found of special interest, for it shows large varieties of fruits including mangoes, oranges, bananas, guavas and figs. Strawberries are grown at Mahabeshwar, the Hill Station (where the Government of Bombay spends two months of the year).

ARTS AND CRAFTS.

Although Bombay is a great industrial province, employing some 360,000 persons in power industries—of whom 280,000 are employed in textile factories—the ancient arts and crafts still flourish, and the exhibits in this section of the Bombay Court do not suffer in comparison with that displayed by other provinces less affected by the influence of industrialism and power production. While in the Presidency there are nearly 4,000,000 spindles and 90,000 power looms, handloom weaving is still a flourishing industry, supplying more than a quarter of the total cloth required by the population of the Presidency, the amount being equal to that produced by the power looms. It is noticeable too, that in many cases the handloom flourishes vigorously under the very shadow of the power loom, notably at Sholapur, and the efforts of Co-operative Societies and the Department of Industries have been successful in effecting improvements in method and material which have materially helped the industry in its fight against the competition of the mills. Calico printing continues to be a flourishing trade but, considered as an art, it is degenerating. This, unfortunately, is the case with many handicrafts, the working of silver being one.

SILVER WARE.

The gold and silversmiths' craft is one of the widest spread in the Presidency. There is hardly a village of any size in which a goldsmith is not to be found and in the Cities their number is considerable. One reason for this is that the goldsmith is still to the mass of the people of India what Gresham or the Lombards were to England centuries ago. Next to the United States India to-day is the greatest absorber of gold and silver in the world. The Indian prefers to invest his savings in precious metals. He goes to the goldsmith and buys as much gold as he can afford and the goldsmith makes it up into a bracelet or a ring. When bad times come he goes back to the goldsmith and either sells the article or borrows money on it. The goldsmith therefore is both the banker and the pawnbroker of the uneducated Indian communities. Moreover, he is a craftsman as can be seen from the magnificent examples of silver work from Poona shown in the Bombay Court. The traditions of good work have not expired and the School of Art in Bombay has classes filled almost entirely by children of the goldsmith caste, where artistic ideals are being taught. Regarded as a trade, production is particularly remunerative at Kolhapur and Sangli in the Southern Maratha Country. In general in India ornaments are only made to order. But from these two centres, ready made ornaments are exported in great numbers to other places for sale.

SANDALWOOD.

Wood carving and the decoration of houses by beautiful designs in darkened wood is one of the handicrafts in which India has excelled. The specimens of blackwood furniture are excellent examples of the work usually met with. Sandalwood is, however, the most popular and the most expensive of all woods. It is engraved, inlaid or veneered, and made into a variety of most beautiful and artistic articles, for it is supposed, after ivory, to be best suited for ornamental treatment. The chief centres of sandalwood carving in the Bombay Presidency are Kanara and Surat, and the specimens shown are from these places. Some of the work turned out is of exquisite delicacy, although the tools employed by sandalwood carvers are extremely simple—almost primitive. A saw, a plane, a mallet, and an assortment of chisels and gravers of various kinds and sizes (some extremely minute and delicate) are all he uses. The work is started either by drawing the pattern that is intended to be produced on smooth and white-washed sandalwood, or on a piece of paper pasted over its surface. This is then engraved or outlined in every detail. The interspaces between the lines are next cut away, thus leaving the pattern in low relief. Lastly, the design itself is carved in the minutest detail by chisels fine and still finer as the work progresses. In this way every effect of light and shade, every curve and expression, and every texture that may be desired, is portrayed. The minuteness and intricacy of elaboration aimed at are alone equalled by the results attained by the ivory carver. Some of the finest sandalwood boxes are miracles of delicacy.

LEATHER.

Cawnpore is famous all over the East for its saddlery, but it is not ornamented in any way. Ornamental camel trappings are made at certain places in Rajputana. Kundla, in Kathiawar, produces curiously interesting horse trappings. From the standpoint of art the embroidered leather sheets of Hyderabad (Sind) are of far greater importance. These consist of Sambur leather, and have central medallions, borders and cover pieces, done in applique, with black, red or green leather, elaborately embroidered over the surface in chain stitch, and with silver and gold wire judiciously intertwined. The designs are bold and effective, and the scheme of colour is somewhat barbaric.

CARPETS.

The Persian traders appear to have early established the trade of manufacturing carpets on the Western Coast, and Bombay was one of the earliest seats of this craft. The Dutch naturalist and explorer, Van Linschoten, who came to India in 1576, speaks of the manufacture of carpets at Cambay. Woollen carpets are manufactured at Ahmedabad.

SILKS.

The most valuable silk work in the Presidency, from the artistic point of view, is done at Surat and Ahmedabad, Surat being still the main centre of the trade. In this town there is one factory in which silk is turned out for sale in France, whence it is re-exported as Lyons silk.

A valuable home industry in Surat and in Ahmedabad consists in which is known as Kinkhab, a fabric of gold thread woven into a silk foundation beautifully flowered in exquisite patterns, and in the case of the Ahmedabad type, very strong and heavy. The work has an enduring artistic value, and is unique in the world. Compared even to the fine gold and silk embroidery turned out, especially in recent years, for ladies' dresses in France, the Surat and Ahmedabad Kinkhab is far superior.

The silk used in the Presidency is still almost entirely imported from China or Persia.

The specimen saris, cloths, etc., are produced in Surat, Poona, Sind, etc., and a good deal of embroidered work is still exported for the European market.

THE INDIAN ROOM.

Designed, constructed, furnished and decorated by the staff and students of the School of Art, Bombay, under the direction of the Principal, Capt. W. E. Gladstone Solomon.

The room is 18 feet square and 10 feet high, constructed throughout of Malabar teak, and very solidly built. The painted ceilings and frieze are noticeable features of the room. The former consists of a circular central panel and eight surrounding panels, four triangles, and a decorated border. The subject of the ceiling panels is the Sun God "Surya" and the eight planets. "Surya" plays a very important part in Hindu Mythology, and is here shown in his chariot, drawn by seven horses, symbolising the seven rays of the Sun. The planets represented are "Soma" (the Moon) on an antelope; "Mangal" (Mars), the flame-coloured figure riding on a goat; "Budh" (Mercury) on a lion; "Brihaspati" (Jupiter) on a swan; "Rahu" (Uranus) with serpent's tail; "Shukra" (Venus) on a white horse; "Ketu" (Neptune) on an eagle; and "Shani" (Saturn) mounted on a bullock.

The mural panels on the wall represent some of the best efforts of the senior students. These are seven in all, including the "Ganpati Procession," by Mr. A. A. Bhonsale, which has received a special gold medal, presented by Sir George Lloyd, late Governor of Bombay; and "Piety," by Mr. N. L. Joshi, which was awarded the Governor's Silver Medal. The remaining subjects are "Painting," "Scripture," "Music," "Industry" and "Agriculture." On the floor is a carpet woven by students in the Carpet Weavers' class. It is Persian in its design of arabesques on a gold ground, and is a much finer production than is usually obtainable in Bombay.

The furniture consists of a "Gadi" (seat of honour), beautifully carved

and upholstered with rose-coloured silk, with its "Chattra" (umbrella) of the same material ; a "Chaurang" (small table) with beaten brass representations taken from the frescoes in the Ajanta Caves ; a carved table, cabinet and pedestals, supporting statuettes in white marble and plaster of Paris.

These examples of the modelling class represent the god Siva, and an ideal figure of "Harmony." The modelling class is also partly responsible for the silver statuette of the goddess "Bhavani" riding upon a tiger and destroying the demon "Mahishasur," which was finished in the Reay Art Workshop of the School of Art. The shrine itself is of carved woodwork with a canopy in Indo-Saracenic style, and is affixed to the wall. In front of it on a stand are displayed the fine Lamps, the Rose Water Sprinkler, Attardan and Salver (all in silver), which are prominent features of an Indian room. Several vases, examples from the School of Art Potteries, are shown in the Cabinet.

A fine brass lamp, the result of many weeks' laborious effort on the part of the Iron Work Class, hangs between the beautifully carved perforated windows.

For a full description of the "Indian Room" and the mural paintings for which the Bombay School of Art is celebrated, visitors should consult the book entitled "The Bombay Revival of Indian Art," which is on sale in the Exhibition premises.

Names of Private Exhibitors.

| Exhibits. | Exhibitors and their [Addresses. |
|--|--|
| Woollen rugs, shawls, plaids, etc. . . | Indian Woollen Mills, Canada Building, Fort Bombay. |
| Carpets, woollen | Harilal Bakerbhoy & Co., 6 Kanta Building, Kalbadevi Road, Bombay, |
| Carved wood furniture. | E. Wimbridge, Ltd., 16 Slater Road, Bombay. |
| Silver cups | N. G. Sakrikar Bros., 410 Ravinar Peth, Poona City. |
| Pickles and condiments | D. D. Framji & Co., Bombay. |
| W. H. Collenson & Co., Ltd., 165, | Fenchurch Street, E.C.3. |
| Arts and crafts. Silks, plain and embroidered. Cotton prints, sandalwood boxes, brocades, enamelled and plain brassware, ivory carving, carved wood, furniture, etc. | Pouhmull Bros., Apollo Bundur, Bombay. |
| | F. J. Bhumgara, 28 Camomile Street, London, E.C.2. |
| Silk brocade | Motilal Chumilal Reshamurwalla, Surat. |
| Do. do. | Alibhoy Jaybhoy, Kinkhabwalla, Surat. |
| Sandalwood box | Vaman Subrao, Shetty, Kumata District, Kanara. |
| Silk knitted picture of H.M. the King | Mr. Janurabai, Gukhle, Poona. |
| Oil Paintings | D. K. Mahratre, Esq. |
| Do. do. | M. A. Joshi. |
| Fancy silks, Brassware | D. B. Barve, Bombay. |

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CALICO PRINTERS, FARRUKHABAD,
U.P. INDIA.

TONK STATE JAIL, RAJPUTANA, INDIA INDUSTRIES DEPARTMENT

The Tonk State Jail specialises in Namdahs (woollen mats and carpets) and Durries (cotton carpets), and orders for these articles are received from several places in Europe and from all parts of India. Namdahs are made of pure wool, and are of all patterns and sizes. They are woven plain, or in fancy coloured designs according to order. Durries can be made of all sizes. Striped and check designs are highly popular. Blue Durries with embroidered borders and coloured centre pieces are a speciality. Woollen carpets with designs in colours are also turned out in large numbers. All articles are in attractive patterns and pleasing colours.

Samples of Namdahs, Durries, and Carpets are on view at the Tonk State Jail Stall. A trial order is solicited. Namdahs, Durries, and Carpets made at the Tonk State Jail are cheaper than those produced in any other part of India.

For further particulars apply to—

S. T. HOLLINS, ESQ., Judicial Member, Tonk, Rajputana, India

or to—

**CAPT. W. F. WEBB, I. A. c/o The East India United Services
Club, 16, St. James' Square, London.**

UNITED PROVINCES OF AGRA AND OUDH

THE area of this Province is 107,164 square miles, with a population of about 50,000,000. It includes four distinct tracts of country, namely portions of the Himalayas, the sub-Himalayan tracts, the great Gangetic Plain, and portions of the hill systems of Central India. The Himalayan Tract which lies on the extreme north is generally mountainous and includes some of the wildest and most magnificent scenery in the whole range of the Himalayas, and among their snow clad peaks the sacred streams of the Ganges and Jumna take their rise. Many famous temples and places of pilgrimage lie in the upper course of the Ganges and thousands of pious Hindus from all parts of India, annually visit the sacred source. A model of an assemblage of this description at Hardwar will be seen in the Railway Court.

The pressure on the soil is greater than in any other province in India. The principal crops are rye, wheat, grain, barley, millet, maize, and oil seeds, while cotton and sugar cane also deserve mention.

ARTS AND MANUFACTURES.—Cotton ginning is one of the chief industries. The most important industry in the United Provinces is the silk weaving industry of which Benares is the chief centre. The chief fabrics made at Benares are brocades adorned with gold and silver threads, specimens of which are exhibited in the court.

Embroidery in silk or cotton is also another special industry for which the city of Lucknow is famous. Cotton carpets are woven in abundance, the chief centre being Agra. The chief centres for the manufacture of woollen carpets are Mirzapur and Agra. The art of dying is practised in all parts of the provinces and is applied to wool, silks and leather. Till within the last quarter of a century the dyes used were chiefly of vegetable origin. The use of aniline and alizarine has increased enormously and is fast driving out the older art. The United Provinces are also noted for their brass and copper work of which the wares from Moradabad deserve special mention and visitors to the Exhibition can see specimens. The manufacture of sugar is of great importance and it has become a useful source of employment for many. A brief sketch of the industrial activity of this province would be incomplete without a mention of its woollen mills and its tanneries. Cawnpore is important in this connection. Leather goods, including boots and shoes, saddlery, military and police accoutrements, are produced and exported to many parts of the world as well as sold in India.

The chief exports are wheat, oil seeds, raw cotton, sugar, molasses, opium, hides and ghee (clarified butter), while the chief imports are English and Indian cotton goods, metals, kerosine oil, salt and spices. Agricultural produce amounts to about 60 per cent. of the exports and 15 per cent. of the imports in normal years.

Agricultural Products.

| | |
|----------------------------|--|
| Curry Powder (packets) .. | Vishnudutt & Co., Balawali, Bijnore District. |
| Syrups | B. P. Halder & Sons, Benares. |
| Chutneys | Do. do. |
| Jellies | Do. do. |
| Preserved Aura | Do. do. |
| Honey | Govin & Co., Nainital. |
| Chewing tobacco (tablets) | Ashgar Ali Mohammed Ali, Lucknow. |
| Ghee (clarified butter) .. | Tulsiram Jialal, Cawnpore. |
| Rice and tea | Major Kunwar Shamsher Bahadur Singh, Dehra Dun. |
| Do. | Tulsiram Jialal, Cawnpore. |
| Spices | Tulsiram Jialal, Cawnpore. |
| Do. | Do. do. |
| Pulses | Do. do. |
| Hides | Cawnpore Tannery Company, Cawnpore. |

Oil Seeds and Products.

| | |
|--|---|
| Rapeseed Cake powder .. | United Provinces Oil Mills Co., Agra. |
| Oil cakes | United Provinces Oil Mills Co., Agra. |
| Do. | United Provinces Central Mill, Cawnpore. |
| Oils (Rapeseed, castor, jati, etc.) | U. P. Oil Mills Co., Agra. |
| Do. do. | U. P. Central Mill, Cawnpore. |
| | Major Kunwar Shamsher Bahadur Singh, Deharandun. |
| Oilseeds : rapeseed (yellow and brown), lahaseed, | U. P. Mills Co., Agra. |
| kardiseed, etc. | U. P. Central Mill, Cawnpore. |

Gold and Silver Ware.

| | |
|--------------------|--------------------------------------|
| Gold rings | Debidas, Goldsmith, Gokalpura, Agra. |
| Tea sets | Arts and Crafts Emporium, Lucknow. |
| Vases | Do. do. |
| Tumblers | Do. do. |
| Cups | Do. do. |
| Hookah | Do. do. |
| Rings | Do. do. |

Copper and Brass Ware.

| | |
|--------------------------|---|
| Mantle decorations .. | Vishnudutt & Co., Balawali, Dist. Bijnore. |
| Tea heaters, complete .. | J. H. Johnson & Co., Aligarh. |
| Vases | Kalyandas Bros., Benares. |
| Vases | C. L. Khannah & Co., Moradabad. |
| | Dasamal Sohanlal, Moradabad. |
| | Oriental Arts Emporium, Moradabad. |
| | Mohammed Yar Khan, Moradabad. |
| | Director of Industries, Benares State, Fort Ramnagar, Benares. |
| | Kalyandas Bros., Benares. |

Copper and Brass Ware—*contd.*

| | | |
|---|-------------|---|
| | | Arts and Crafts Emporium, Lucknow. |
| | | Miss Florence Holland, Mussoorie. |
| Trays (table, tea, coffee, oval, round, pin, ash) .. | | C. L. Khannah & Co., Moradabad. |
| Cigar boxes | | Dasamal Sohanlal, Moradabad. |
| Bowls (for flowers, ashes, etc. | | Oriental Arts Emporium, Moradabad. |
| | | Arts and Crafts Emporium, Lucknow. |
| Candlesticks | | Miss Florence Holland, Mussoorie. |
| Cigarette boxes | | Mohammed Yar Khan, Moradabad. |
| Do. | | Dasamal Sohanlal, Moradabad. |
| Finger bowls | | Mohammed Yar Khan, Moradabad. |
| Do. | | Hafiz Azizuddin, Moradabad. |
| Do. | | Dasamal Sohanlal, Moradabad. |
| Do. | | Oriental Arts Emporium, Moradabad. |
| Do. | | Mohammed Yar Khan, Moradabad. |
| Do. | | Director of Industries, Benares State, Fort Ramnagar, Benares. |
| Do. | | Kalyandas Bros., Benares. |
| Do. | | Arts and Crafts Emporium, Lucknow. |
| Do. | | Miss Florence Holland, Mussoorie. |
| Plates | | C. L. Khannah & Co., Moradabad. |
| Do. | | Dasamal Sohanlal, Moradabad. |
| Do. | | Oriental Arts Emporium, Moradabad. |
| Do. | | Mohammed Yar Khan, Moradabad. |
| Do. | | Kalyandas Bros., Benares. |
| Cigar sets | | Dasamal Sohanlal, Moradabad. |
| Sugar basins | | Mohammed Yar Khan, Moradabad. |
| Butter dishes | | Miss Florence Holland, Mussoorie. |
| Handkerchief boxes | Do. do. do. | |
| Soap dishes | Do. do. do. | |
| Washing basins | Do. do. do. | |
| Cups and saucers | Do. do. do. | |
| Tobacco boxes | Do. do. do. | |
| Baskets | Do. do. do. | |
| Paper clips | Do. do. do. | |
| Tea pots | Do. do. do. | |
| Napkin rings | | Dasamal Sohanlal, Moradabad. |
| Matchboxes | | Mohammed Yar Khan, Moradabad. |
| Rose water sprinklers .. | | Miss Florence Holland, Mussoorie. |
| Egg cups and egg cup sets, with tray. | | Dasamal Sohanlal, Moradabad. |
| | | Mohammed Yar Khan, Moradabad. |
| Snuff boxes | | Arts and Crafts Emporium, Lucknow |
| Table tops | Do. do. do. | |
| Salvers | Do. do. do. | |
| Paper cutters | Do. do. do. | |
| Inkstands | Do. do. do. | |
| Jewellery boxes | Do. do. do. | |
| Tumblers | Do. do. do. | |
| Jugs | Do. do. do. | |
| Calendars | Do. do. do. | |
| Powder boxes | Do. do. do. | |
| Aftabas | Do. do. do. | |
| Decanters | Do. do. do. | |
| Idols | | Dasamal Sohanlal, Moradabad. |
| Picture frames | | Kalyandas Bros, Benares. |

Copper and Brass Ware—*contd.*

| Articles Exhibited. | Exhibitor. |
|--|--|
| Toys | Vishnudutt & Co., Balawal. |
| Panchpatra with Achami (Mantle decoration). | |
| Cake stand | Dasamal Sohanlal, Moradabad. |
| Century calendar | C. L. Khannah & Co., Moradabad. |
| Folding chair and table | Do. do. do. |
| Pandan, or betel box | Do. do. do. |
| Hookah | Do. do. do. |
| Flowerpots and vases | C. L. Khannah & Co., Moradabad. |
| Do. do. | Kalyandas Bros., Benares. |
| Do. do. | Miss Florence Holland, Mussoorie. |
| Button and Badge | J. H. Johnson & Co., Aligarh. |
| Do. do. | Fuller's Metal Works, Aligarh. |
| Padlocks | J. H. Johnson & Co., Aligarh. |
| Do. | D. K. & Sons, Aligarh. |
| Do. | Diamond Jubilee Lock Works, Aligarh. |
| Do. | Fuller's Metal Works, Aligarh. |
| Do. | Industrial Factory and Lock Works, Aligarh. |
| Visiting card cases | J. H. Johnson & Co., Aligarh. |
| Plates (thalis) | Dasamal Sohanlal, Moradabad. |
| Do. | Director of Industries, Benares State, Fort Ramngar, Benares. |
| Do. | Kalyandas Bros., Benares. |

Iron and Steel Articles.

| | |
|-------------------------------------|---|
| Thumb impression sets | J. H. Johnson & Co., Aligarh. |
| Tumbler, tray and cover | Do. do. |
| Bells, metal gongs | Do. do. |
| Visiting card cases | Do. do. |
| Padlocks | Do. do. |
| Do. | D. K. & Sons, Aligarh. |
| Do. | Diamond Jubilee Lock Works, Aligarh. |
| Do. | Industrial Factory and Lock Works, Aligarh. |
| Buttons and Badges | J. H. Johnson & Co., Aligarh. |
| Do. do. | Fuller's Metal Works, Aligarh. |
| Door fittings and locks | Do. do. do. |
| Nutcutters | Industries Department, Rampur State, Rampur. |
| Daggers (champai) | Do. do. do. |
| Paper cutters | Do. do. do. |
| Cigarette cases | Do. eo. do. |
| Pen cases | Do. do. do. |
| Small platters | Do. do. do. |
| Spears | Do. do. do. |
| Pallett bow (single and double). | Do. do. do. |
| Pallett bow balls | Do. do. do. |

Textiles.

COTTON—

| | |
|----------------|--|
| Prints | Sumerchand Sendurchand Sadh, Sadhwara, Farrukhabad. |
| Do. | Sheonarain Jagatnarain, Farrukhabad. |
| Do. | Kallan Khan Rasul Baksh, Lucknow. |

| Articles Exhibited. | | | | Exhibitor. | | |
|----------------------------------|-----|----|----|---|-----|-----|
| Textiles—contd. | | | | | | |
| Prints | .. | .. | .. | Rai Saheb Harprasad, Bijnore. | | |
| Do. | .. | .. | .. | Cawnpore Composite Stall, Cawnpore. | | |
| Bedspreads or covers | | | .. | Sumerchand Sendurchand Sadh, Sadhwara, Farrukhabad. | | |
| Do. | do. | | .. | Sheonarain Jagatnarain, Farrukhabad. | | |
| Do. | do. | | .. | Kallam Khan Rasul Bakhsh, Lucknow. | | |
| Do. | do. | | .. | Cawnpore Dyeing and Cloth Printing Co., Ltd. | | |
| Do. | do. | | .. | Khan Saheb Qabul Ahmad, Sandila. | | |
| Do. | do. | | .. | Arts and Crafts Emporium, Lucknow. | | |
| Do. | do. | | .. | Cawnpore Composite Stall, Cawnpore. | | |
| Chintzes | .. | .. | | Rai Saheb, Harprasad, Bijnore. | | |
| Table cloths | | .. | .. | Sumerchand Sendurchand, Sadh, Sadhwara, Farrukhabad. | | |
| Do. | | .. | .. | Sheonarain Jagatnarain, Farrukhabad. | | |
| Do. | | .. | .. | Khan Saheb Qabul Ahmad, Sandila. | | |
| Do. | | .. | .. | Arts and Crafts Emporium, Lucknow. | | |
| Do. | | .. | .. | Cawnpore Composite Stall, Cawnpore. | | |
| Cotton tweeds | .. | .. | | Do. | do. | do. |
| Cotton Shikar cloths | | .. | | Do. | do. | do. |
| Dusters | .. | .. | .. | Do. | do. | do. |
| Shirtings | .. | .. | .. | Do. | do. | do. |
| Khaki drills | .. | .. | .. | Do. | do. | do. |
| Serviettes | .. | .. | .. | Do. | do. | do. |
| Towels | .. | .. | .. | Industries Dept., Rampur State, Rampur. | | |
| Bath mats | | .. | .. | Cawnpore Composite Stall, Cawnpore. | | |
| Bandage rollers | .. | .. | .. | Do. | do. | do. |
| Absorbent cotton pieces | | | | Do. | do. | do. |
| Carpets | .. | .. | .. | Do. | do. | do. |
| Prayer mats | | .. | .. | Cawnpore Composite Stall and Arts and Crafts Emporium, Lucknow. | | |
| Jute carpets and rugs | .. | | .. | Cawnpore Composite Stall, Cawnpore. | | |
| Cotton puttees | .. | .. | | Do. | do. | do. |
| Waist belts (single and in roll) | | | | Do. | do. | do. |
| Turban bands | Do. | | | Do. | do. | do. |
| Durries | .. | .. | .. | Industries Dept., Rampur State, Rampur. | | |
| Do. | .. | .. | .. | Cawnpore Dyeing & Cloth Printing Co., Ltd., Cawnpore. | | |
| Do. | .. | .. | .. | Arts and Crafts Emporium, Lucknow. | | |
| Do. | .. | .. | .. | Cawnpore Composite Stall, Cawnpore. | | |
| Stockings | .. | .. | .. | Cawnpore Composite Stall, Cawnpore. | | |
| Yarns | .. | .. | .. | Do. | do. | do. |
| Caps (plain & embroidered) | | | | Industries Dept., Rampur State, Rampur. | | |
| Curtains | .. | .. | .. | Sumerchand Sendurchand Sadh, Sadhwaram, Farrukhabad. | | |
| Do. | .. | .. | .. | Sheonarain Jagatnarain, Farrukhabad. | | |
| Do. | .. | .. | .. | Industries Dept., Rampur State, Rampur. | | |
| Do. | .. | .. | .. | Kallan Khan Rasul Bakhsh, Lucknow. | | |
| Do. | .. | .. | .. | Cawnpore Dyeing & Cloth Printing Co., Ltd., Cawnpore. | | |
| Do. | .. | .. | .. | Khan Saheb Qabul Ahmad, Sandila. | | |
| Do. | .. | .. | .. | Arts and Crafts Emporium, Lucknow. | | |
| Do. | .. | .. | .. | Cawnpore Composite Stall, Cawnpore. | | |
| Table centre pieces | | | .. | Khan Saheb Qabul Ahmad, Sandila. | | |

| Articles Exhibited. | Exhibitor. |
|--|---|
| Textiles—contd. | |
| Coloured yarns | Mannilal, Benimadho, Kanauj. |
| Cotton waste | R. Agarwal & Co., Cawnpore. |
| Waste cotton | Do. do. |
| Dress materials (Doria, Malmal, Khes, Jamdani, etc.) | Haji Wali Mohammed Abdulgafur, Mau Dist, Azamgarh. |
| Do. do. | Cawnpore Composite Stall, Cawnpore. |
| Do. do. | Industries Dept., Rampur State, Rampur. |
| Do. do. | Hafiz Abdussattar Noor Mohammed, Tanda, Fyzabad. |
| Do. do. | Arts and Crafts Emporium, Lucknow. |
| Embroidered Saries (Jamdani) | Hafiz Abdussattar Noor Mohammed, Tanda, Fyzabad. |
| Cushion covers | Sumerchand Sendurchand Sadh, Sadhwara, Farrukhabad. |
| Do. | Sheonarain Jagatnarain, Farrukhabad. |
| Do. | Kallan Khan Rasul Bakhsh, Lucknow. |

WOOLLEN—

| | |
|--|--|
| Rugs | Cawnpore Composite Stall, Cawnpore. |
| Blankets | Do. do. do. |
| Fancy waistcoats | Do. do. do. |
| Sweater coats | Do. do. do. |
| Mufflers | Do. do. do. |
| Embroidered lohis | Do. do. do. |
| Dress materials | Do. do. do. |
| Puttoo cloths (cotton mixture) | Do. do. do. |
| Flannelettes (striped and white) | Do. do. do. |
| Table cloth materials | Do. do. do. |
| Carpets | J. Tondon & Co., Mirzapur. |
| Do. | Oriental Carpet Manufacturers, London. |
| Do. | Kailas Carpet Factory, Agra. |
| Do. | Director of Industries, Benares State, Fort Ramnagar, Benares. |
| Do. | Arts and Crafts Emporium, Lucknow. |
| Vests | Cawnpore Composite Stall, Cawnpore. |
| Jerseys (football) | Do. do. do. |
| Pants (football) | Do. do. do. |
| Shawls | Oriental Arts Emporium, Moradabad. |
| Do. | Khan Saheb Qabul Mohammed, Sandilla. |
| Prayer mats | Cawnpore Composite Hall, Cawnpore. |

Silk—Plain, Embroidered, and Brocades, etc.

| | |
|---------------------------------|---|
| Silk Brocade | Oriental Arts Emporium, Moradabad. |
| Do. | Manniram Harjiwanram, Gaighat, Benares City. |
| Do. | Girdhardas Jagmohandas, Phatak Sukhlal Sah, Benares City. |
| Do. | Nagar Bros., 21, Golagali, Benares City. |
| Do. | Miss Florence Holland, Mussoorie. |
| Tapestry for wall hanging | Manniram Harjiwanram, Gaighat, Benares City. |

| Articles Exhibited. | Exhibitor. |
|--|---|
| Silk—Plain, Embroidered, and Brocades, etc.—<i>continued</i>. | |
| Tapestry for wall hanging | Girdhardas Jagmohandas, Phatak Sukhlal Sah, Benares City. |
| Do. do. .. | Arts and Crafts Emporium, Lucknow. |
| Tapestry for upholstery .. | Manniram Harijiwanram, Gaighat, Benares City. |
| Do. do. .. | Girdhardas Jagmohandas, Phatak Sukhlal Sah, Benares City. |
| Washing Silk dress material (plain, twill, and striped) | Oriental Arts Emporium, Moradabad. |
| Do. do. | Nagar Bros., 21, Golagali, Benares City. |
| Do. do. | Khan Saheb Qabul Ahmad, Sandila. |
| Do. do. | Ranchordas Agarwal, Wellesleygung, Mirzapur. |
| Do. do. | Director of Industries, Benares State Ramnagar Fort, Benares. |
| Do. do. | Miss Florence Holland, Mussoorie. |
| Scarves (plain striped, embroidered and designs) | Oriental Arts Emporium, Moradabad. |
| Do. do. | Manniram Harijiwanram, Gaighat, Benares City. |
| Do. do. | Girhardas Jagmohandas, Phatak, Sukhlal Sah, Benares City. |
| Do. do. | Nagar Bros., 21, Golagali, Benares City. |
| Mufflers | Oriental Arts Emporium, Moradabad. |
| Do. | Manniram Harijiwanram, Gaighat, Benares City. |
| Do. | Girhardas Jagmohandas, Phatak Sukhlal Sah, Benares City. |
| Do. | Nagar Bros., 21, Golagali, Benares City. |
| Tissue | Nagar Bros., 21, Golagali, Benares City. |
| Sari | Oriental Arts Emporium, Moradabad. |
| Do. | Nagar Bros., 21, Golagali, Benares City. |
| Mercerised curtains .. | Khan Saheb Qabul Ahmad, Sandila. |
| Shirting cloth (washing) .. | Haji Wali Mohammad Abdulgafur, Mau District. |
| Do. do. | Khan Saheb Qabul Ahmad, Sandila (Azamgarh). |
| Amru Cloth (for upholstery) | Haji Wali Mohammed Abdulgafur, Mau District, Azamgarh. |
| Galta cloth | Do. do. do. |
| Brocade pieces (for ladies' shoes) | Manniram Harijiwanram, Gaighat, Benares City. |
| Do. do. | Girdhardas Jagmohandas, Phatak Sukhlal Sah, Benares City. |
| Do. do. | Oriental Arts Emporium, Moradabad. |
| Purses | Nagar Bros., 21, Golagali, Benares City. |
| Do. | Girdhardas Jagmohandas, Phatak, Sukhlal Sah, Benares City. |
| Shoe leaf, embroidered .. | Industries Dept., Rampur State, Rampur. |
| Uppers for ladies' dancing shoes. | Industries Dept., Rampur State, Rampur. |
| Do. do. | Girdhardas Jagmohandas, Phatak Sukhlal Sah, Benares City. |
| Do. do. | Oriental Arts Emporium, Moradabad. |
| Do. do. | Standard Boot and Shoe Factory, Lucknow. |

| Articles Exhibited. | Exhibitor. |
|--|---|
| Silk—Plain, Embroidered, and Brocades, etc.—<i>continued</i>. | |
| Print on silk | Sumerchand Sendurchand Sadh, Sadhwara, Farrukhabad. |
| Do. | Sheonarain Jagatnarain, Farrukhabad. |
| Do. | Kallan Khan Rasul Bakhsh, Lucknow. |
| Do. | Arts and Crafts Emporium, Lucknow. |
| Silk embroidery | Oriental Arts Emporium, Moradabad. |
| Do. | Phillips and Brothers, Lucknow. |
| Garlands | Vishudutt & Co., Balawali District, Bijnore. |

Leather Industries.

| | |
|--------------------------------------|---|
| Ladies' Shoes | Standard Boot and Shoe Co., Lucknow. |
| Sandals | Cawnpore Composite Stall, Cawnpore. |
| Gents' shoes | Shahgunj Shoe Factory, Agra. |
| Gents' slippers | Fookson & Co., Cawnpore Road, Allahabad. |
| Gents' boots | Standard Boot and Shoe Co., Lucknow. |
| Do. | Cawnpore Composite Stall, Cawnpore. |
| Do. | Shahgunj Shoe Factory, Agra. |
| Do. | Fookson & Co., Cawnpore Road, Allahabad. |
| Do. | Army and Police Equipment Supply Co., Cawnpore. |
| Children's shoes | Standard Boot and Shoe Co., Lucknow. |
| Do. | Cawnpore Composite Stall, Cawnpore. |
| Do. | Shahgunj Shoe Factory, Agra. |
| Do. | Fookson & Co., Cawnpore Road, Allahabad. |
| Polo saddles | Army and Police Equipment Supply Co., Cawnpore. |
| Do. | Cawnpore Composite Stall, Cawnpore. |
| Twine Girths | Army and Police Equipment Supply Co., Cawnpore. |
| Double bridle with double rein | Army and Police Equipment Supply Co., Cawnpore. |
| Do. do. | Cawnpore Composite Stall, Cawnpore. |
| Martingale | Army and Police Equipment Supply Co., Cawnpore. |
| Stirrup leather | Do. do. do. |
| Sam Browne belts | Do. do. do. |
| Suitcases | Standard Boot and Shoe Factory, Lucknow. |
| Blouse Cases | Cawnpore Composite Stall, Cawnpore. |
| Attaché cases | Do. do. do. |
| Sticks | Raghubardayal, Ganeshprasad, Ganeshilal, Rampradad, Abugar, Fatehpur. |
| Do. | Shamshad Mohammed & Son, Meston Road, Cawnpore. |
| Whips, driving and riding | Raghubardayal, Ganeshprasad, Ganeshilal, Rampradad, Abugar, Fatehpur. |
| Do. do. | Shamshad Mohammed & Son, Meston Road, Cawnpore. |
| Stuffed crocodiles | Phillips Bros., Lucknow. |
| Do. | L. L. Metha & Co., Cawnpore. |
| Lizard skins | Phillips & Bros., Lucknow. |
| Furs | Miss Florence Holland, Mussoorie. |

Chemicals and Perfumery.

| | |
|---------------|-------------------------------|
| Essence | B. P. Halder & Sons, Benares. |
| Extract | Do. do. |

| Articles Exhibited. | Exhibitor. |
|--|---|
| Chemicals and Perfumery — <i>continued.</i> | |
| Invigorator | B. P. Halder & Sons, Benares. |
| Golden Sarsaparilla | Do. do. |
| Emulsion of cod oil | Do. do. |
| Boot polishes | T. N. Tankha, Golagunj, Lucknow. |
| Scent or attar | Debiprasad Sunderlal Khetry, Kanauj. |
| Do. | Ashgar Ali Mohammed Ali, Lucknow. |
| Do. | Bisheshardayal Girishchandra, Saraimiran, District, Farrukhabad. |
| Scent boxes or attar boxes | Bisheshardayal Girishchandra, Saraimiran, District, Farrukhabad. |
| Hair oils | Ashgar Ali Mohammed Ali, Lucknow. |
| Ottos | Debiprasad Sunderlal Khetry, Kanauj. |
| Do. | Ashgar Ali Mohammed Ali, Lucknow. |
| Pachouli oil | Forest Products, Ltd., Cawnpore. |
| Palmarosa oil | Do. do. |
| Musk | Govin & Co., Nainital. |

Marble Goods.

| | |
|---|-----------------------------------|
| Trays | Agra Marble Works, Agra. |
| Flooring tiles | Do. do. |
| Top idols | Do. do. |
| Do. | Vishnudutt & Co., Balawali. |
| Alabaster | Agra Marble Works, Agra. |
| Do. | Miss Florence Holland, Mussoorie. |
| Models of the Taj Mahal, Agra, and other buildings | Agra Marble Works, Agra. |
| Do. do. | Miss Florence Holland, Mussoorie. |
| Do. do. | Vishnudutt & Co., Balawali. |
| Do. do. | Phillips & Bros., Lucknow. |
| Boxes | Agra Marble Works, Agra. |
| Do. | Vishnudutt & Co., Balawali. |
| Paper weights | Agra Marble Works, Agra. |
| Plates | Do. do. |

Bone Goods.

| | |
|-----------------------------|----------------------------------|
| Toys | J. N. Tankha, Golagunj, Lucknow. |
| Do. | Vishnudutt & Co., Balawali. |
| Toy tables and chairs | Do. do. |
| Stationery set | Do. do. |
| Paper knives | Do. do. |
| Watch chains | J. N. Tankha, Golagunj, Lucknow. |
| Zari | Vishnudutt & Co., Balawali. |

Wood and Woodwork.

| | |
|---|---|
| Screens | Arts and Crafts Emporium, Lucknow. |
| Do. | Vishnudutt & Co., Balawali. |
| Lamp stands | Do. do. |
| Boxes (handkerchief, cigar, office, glove, cash, etc.) | Allied Indian Woodcrafts, Ltd., Bareilly. |
| Do. do. | Arts and Crafts Emporium, Lucknow. |
| Cake stands | Vishnudutt & Co., Balawali. |
| Tables and teapoyes | Allied Indian Woodcrafts, Ltd., Bareilly. |
| Do. | Arts and Crafts Emporium, Lucknow. |
| Do. | Vishnudutt & Co., Balawali. |

Articles Exhibited.

Exhibitor.

ood and Woodwork—*continued.*

| | |
|---------------------------|---|
| Picture frames | Arts and Crafts Emporium, Lucknow. |
| Do. | Vishnudutt & Co., Balawali. |
| Plate stands | Do. do. |
| Trays | Allied Indian Woodcrafts, Ltd., Bareilly. |
| Do. | Vishnudutt & Co., Balawali. |
| Do. | Arts and Crafts Emporium, Lucknow. |
| Jam spoons and forks .. | Vishnudutt & Co., Balawali. |
| Toys | Do. do. |
| Bowls | Do. do. |
| Horn boxes | Do. do. |
| Garland boxes | Do. do. |
| Sandalwood fans | Do. do. |
| Wooden tops | Allied Indian Woodcrafts, Ltd., Bareilly. |
| Do. | Vishnudutt & Co., Balawali. |
| Do. | Arts and Crafts Emporium, Lucknow. |
| Sticks | Industries Dept., Rampur State, Rampur. |
| Stationery cases | Allied Indian Woodcrafts, Ltd., Bareilly. |
| Wooden stands | Arts and Crafts Emporium, Lucknow. |
| Chairs | Allied Indian Woodcrafts, Ltd., Bareilly. |
| Sideboards | Do. do. do. |
| Flooring | Do. do. do. |
| Camp furniture | Do. do. do. |
| Sandalwood fancy articles | Phillips & Bros., Lucknow. |
| Wall brackets | Arts and Crafts Emporium, Lucknow. |

Ivory Goods.

| | |
|--|-----------------------------|
| Toys | Vishnudutt & Co., Balawali. |
| Necklaces | Do. do. |
| Cigarette holders | Do. do. |
| Locketts | Do. do. |
| Boxes (ring, glove, trinket powder, handkerchief). | Do. do. |
| Paper knives | Do. do. |
| Paintings | Do. do. |

Ebony Goods.

| | |
|----------------------------|------------------------------------|
| Tables | Rai Sahib Harprasad, Bijnore. |
| Do. | Arts and Crafts Emporium, Lucknow. |
| Teapoys | Rai Sahib Harprasad, Bijnore. |
| Do. | Phillips & Bros., Lucknow. |
| Boxes (for trinkets, etc.) | Rai Sahib Harprasad, Bijnore. |
| Do. do. | Phillips & Bros., Lucknow. |
| Do. do. | Arts and Crafts Emporium, Lucknow. |
| Cigar boxes | Phillips & Bros., Lucknow. |
| Jewellery Boxes | Do. do. |
| Screens | Do. do. |
| Sticks | Rai Sahib Harprasad, Bijnore. |
| Do. | Phillips & Bros., Lucknow. |
| Photo frames | Rai Sahib Harprasad, Bijnore. |
| Stationery cases | Do. do. |
| Horn boxes | Do. do. |
| Trays | Arts and Crafts Emporium, Lucknow. |

| Articles Exhibited. | Exhibitor. |
|---|---|
| Miscellaneous. | |
| Perpetual calendar for 10,000 years | Pandit Prabhudayal Tripathi, Agricultural Dept., Nawabgunj, Cawnpore. |
| Manuscripts, ornamental writings and books | Babu Bhagwati Shankar Vakil, High Court, Allahabad, and Industries Dept., Rampur State, Rampur. |
| Fountain pen | Prem Pen Co., 296, Kilburn Lane, W.10. |
| Ancient Stirrups | Mr. C. Coombs, Court of Wards, Gonda. |
| Athletics and Games. | |
| Cricket and hockey balls. . | Dikshit & Co., Meerut. |
| Glassware. | |
| Cigarette pipes .. | Vishnudutt & Co., Balawali. |
| Ash trays (plain and cut glass) | J. H. Johnson & Co., Aligarh. |
| Revolving ash trays with reservoir and nickel plated tops | Do. do. Do. do. |
| Brush, Bristles, Cane and Brooms, etc. | |
| Various brushes (varnish, paint, nail, clothes, etc.) | Brushware Ltd., Cawnpore. |
| Brooms. | Cawnpore Composite Stall, Cawnpore. |
| Ashford's patent tube well strainer. | Do. do. |
| Bristles | K. L. Mehta & Co., Cawnpore. |
| Cane baskets | Industries Dept., Rampur State, Rampur. |
| Pottery. | |
| Vases | J. Tondon & Co., Mirzapur. |
| Plates | Arts and Crafts Emporium, Lucknow. |
| Surahi | Do. do. |
| Brackets | Do. do. |
| Paper weights | Do. do. |
| Clay models | Do. do. |
| Bowls | Arts and Crafts Emporium, Lucknow. |
| Flowerpots | Do. do. |

NAMES AND ADDRESSES OF THE FIRMS AND INDIVIDUALS EXHIBITING IN THE UNITED PROVINCES COURT.

R. Agarwal & Co., Cotton Waste Merchants, Cawnpore.
Agra Marble Works, Marble Workers, Agra.
Allied Indian Woodcrafts, Ltd., Furniture Makers, Bareilly.
Army and Police Equipment Supply Company, Riding Requisite Manufacturers, Cawnpore.
Arts and Crafts Emporium, General Merchants, Lucknow.
Ashgar Ali Mohammed Ali, Perfume Manufacturers, Lucknow.
Babu Bhagwati Shankar Vakil High Court, Allahabad.
Benares State Director of Industries, Fort Ramnagar, Benares, General Industries.
Bisheshardayal Girischandra, Perfume Manufacturers, Saraimiran Dist, Farrukhabad.
Brushware, Ltd., Brush Manufacturers, Cawnpore.
Cawnpore Dyeing and Cloth Printing Company, Ltd., Calico Printers, Cawnpore.
Chairman, Cawnpore Exhibition Committee (Cawnpore Composite Stall), General Merchants, Cawnpore.

Cawnpore Tannery Company, Leather Manufacturers, Cawnpore.
 Dasamal Sohanlal, Brassware Manufacturers, Moradabad.
 Debidas Goldsmith, Goldsmith, Gokalpura, Agra.
 Debiprasad Sunderlal Khetry, Perfume Manufacturers, Kanauj.
 Diamond Jubilee Lock Works, Locksmiths, Aligarh.
 Dikshit & Co., Cricket Ball Manufacturers, Meerut.
 D. K. & Sons, Locksmiths, Aligarh.
 Fookson & Co., Boot and Shoe Manufacturers, Cawnpore Road, Allahabad.
 Forest Products, Ltd., Palmorosa Oil Manufacturers, Cawnpore.
 Fuller's Metal Works, Locksmiths, Aligarh.
 Girhardas Jagmohandas, Brocade and Silk Merchants, Phatak Sukhlal Sah, Benares.
 Govin & Co., General Merchants, Nainital.
 Hafiz Abdussattar Noor Mohammed, Jamdani Manufacturers, Tanda, Fyzabad.
 Hafiz Azizudin, Brassware Manufacturer, Moradabad.
 Haji Wali Mohammed Abdulgafur, Satin Manufacturers, Mau District, Azamgarh.
 B. P. Halder & Sons, Chemists, Benares.
 Miss Florence Holland, General Merchant, Mussoorie.
 Rai Sahib Harprasad, Secretary Exhibition Committee, Bijnore.
 Industrial Factory and Lock Works, Locksmiths, Aligarh.
 J. H. Johnson & Co., Locksmiths, Aligarh.
 Kailas Carpet Company, Carpet Manufacturers, Agra.
 Kallan Khan Rasul Bakhsh, Calico Printer, Lucknow.
 Kalyandas Bros., Brassware Merchants, Benares.
 C. L. Khannah & Co., Brassware Manufacturers, Moradabad.
 Major Kunwar Shamsheer Bahadur Singh, Dehradun.
 Mathurprasad Surajprasad, Perfume Manufacturers, Kanauj.
 Mannilal Benimadho, Perfume Manufacturers, Kanauj.
 Manniram Hajiwanram, Brocade and Silk Merchants, Gaighat, Benares Cty.
 K. L. Mehta & Co., Bristle Merchants, Cawnpore.
 Mohammed Yar Khan, Brassware Manufacturer, Moradabad.
 Nagar Bros., Brocade and Silk Merchants, 21 Golagali, Benares City.
 Oriental Arts Emporium, Silk Merchants, Moradabad.
 Oriental Carpet Manufacturers, Ltd., Carpet Manufacturers, London.
 Pandit Prabhudayal Tripathi, Calendar Manufacturer, Agricultural Department Nawabunj, Cawnpore.
 Phillips & Brothers, General Merchants, Lucknow.
 Khan Saheb Qabul Ahmad, Bedspread Manufacturer, Sandila.
 Raghurdayal, Ganeshprasad, Ganeshlil, Ramprasad, Riding Whip Manufacturers, Abunagar, Fatehpur.
 Rampur State Industries Department, General Industries, Rampur.
 Ranchordas Agarwal, Silk Merchant, Mirzapur.
 Sheonarain Jagatnarain, Curtain Manufacturers, Farrukhabad.
 Shahgunj Shoe Factory, Boot and Shoe Manufacturers, Agra.
 Sumerchand Sendurchand Sadh, Curtain Manufacturers, Sadhwara, Farrukhabad.
 Shamshad Mohammed & Son, Riding Whip Manufacturers, Meston Road, Cawnpore.
 Standard Boot and Shoe Factory, Boot and Shoe Manufacturers, Lucknow.
 J. N. Tankha, Boot Polish Manufacturers, Golagunj, Lucknow.
 J. Tondon & Co., Carpet Manufacturers, Mirzapur.
 Tulsiram Jialal, Spice Merchants, Cawnpore.
 United Provinces Central Mills, Oil Merchants and Seed Crushers, Cawnpore.
 United Provinces Oil Mills Company, Oil Merchants and Seed Crushers, Agra.
 Vishnudutt & Co., Dealers in Indian Arts and Curios, Balawali.

Silver Medal, Lahore Exhibition,
1909-10.

First Class Certificate, Allahabad,
District Exhibition, 1910.

BALBEER MILLS

DEHRA DUN, U.P.

BY APPOINTMENT TO
H.E. THE EARL OF MINTO, VICEROY AND GOVERNOR GENERAL OF INDIA,
and H.H. THE LIEUTENANT-GOVERNOR OF THE UNITED
PROVINCES OF AGRA AND OUDH.

KANWAR SHAMSHER BAHADUR SINGH

Manager

Balbeer Mills and Raipur Tea Estate,
Dehra Dun, U.P.,
INDIA.

PURE MUSTARD OIL

*Extract from the Report of the Industrial and Agricultural Exhibition of the Punjab N.W.F.
Provinces and Kashmir, 1909/10.*

(OILS, OIL SEEDS AND CAKES) BRASSICA (TORIA AND SARASON).

The Punjab, Kashmir, Maler, Kotala, Cochin and Patiala States were the chief contributors of Sarason, Toria (Brassica Sp.). Perhaps the best samples of seeds came from the Cochin State, while the best oils came from the Balbeer Mills, Dehra Dun and Toba Teksingh, Tehsil Lyall pur, Gurdaspur, district of Punjab also sent a very good sample of oil. In many cases the cakes were not very cleanly manufactured. Those from the Ohri Oil and Flour Mills Forezerpure were made on the most up-to-date principles. Silver Medal for best oil awarded to Balbeer Mills, Dehra Dun.

"I have analysed the rapeseed (Sarason) oil, commercially known as Mustard Oil, from the Balbeer Mills, Dehra Dun, and I certify that it is chemically pure rape (Sarason) oil having standard constants. I recommend it as a thoroughly good oil for culinary and medicinal purposes."

(Signed) PURAN SINGH, F.C.S., &c.,

DEHRA DUN,
4th October, 1909.

Acting Imperial Forest Chemist
to the Government of India.

Extract from the Report of the United Provinces Exhibition, 1910/11.

Agricultural Court Awards. Highest award, First Class Certificate.

Best Oil in the Exhibition Brassica varieties (Toria and Sarason Oils). First Class Certificate awarded to Balbeer Mills, Dehra Dun, for the best oil in the Exhibition.

BALBEER MILLS

(continued.)

DEHRA DUN.

BASMATI TABLE RICE

Extract from the Report of the Industrial and Agricultural Exhibition of the Punjab, N.W.F. Provinces and Kashmir, 1909/10.

ORYZA SATIVA (RICE).

A most extensive collection of rice (*Oryza Sativa*) including a vast number of varieties were received from the important rice growing districts of India and from Italy. Special mention may be made of the fine collections from Bengal, Madras, Bombay, the United Provinces Agra and Oudh, Eastern Bengal, Assam, Mysore, Cochin State and Italy, as well as from several districts of the Punjab. Besides the full length plants and threshed grains, samples of rice husked in the primitive and latest processes were to be seen.

The best sample of husked rice was exhibited by the Balbeer Mills, Dehra Dun (United Provinces of Agra and Oudh).

Extract from the Report of the United Provinces Exhibition 1910/11.

Agricultural Court Awards.

The best table rice in the Exhibition, variety Basmati. The highest award Silver Medal presented to Balbeer Mills, Dehra Dun.

5/- Sample Bags available at the Exhibition.

EXHIBITION BRAND TEA

RAIPUR TEA ESTATE.

Owing to most suitable natural situation in the valley of the Dun and the slopes of the Siwalik Hills (Himalayas) all the good qualities, namely, aroma, liquor and flavour are imparted to the tea by nature. The above brand is manufactured from the choice autumn crop and is the purest full bodied highest class tea obtainable.

Trials will convince.

1/- SAMPLE PACKETS

can be had on application to The Secretary, Indian Pavilion, U.P. Section, Wembley.

For full particulars for Oil, Rice and Tea, apply to :

The Manager, Balbeer Mills and Raipur Tea Estate, Dehra Dun, U.P., India.

PUNJAB

THE Punjab, with an area of about 136,000 square miles, and a population of about 25 millions of inhabitants, is mainly an agricultural province, and owes its prosperity and advancement in a great measure to the large development of canal irrigation of recent years. It has few large commercial or industrial concerns, though there are signs that, with the provision of cheap labour and transport facilities, there will be a great advance in industrial developments in the near future.

Agriculture.

The scientific study of agriculture has made great strides in the province, and the exhibits in this section show how much the Punjab owes to the Agricultural College, Lyallpur. In order to impart up-to-date scientific education best fitted to the needs of the province, the staff of the College is engaged on the study of various subjects, *i.e.*, plant blending, agronomy, crop pests, agricultural engineering, etc. In addition to imparting scientific education to the student, the College is the main centre from which agricultural improvements, based on the results of researches, are spread over the province. The Agricultural Department is now in a position to supply Punjab farmers with large quantities of selected seeds of cotton, wheat, cereals, sugar cane and oilseeds, etc., some of which are annually being grown on over 1,000,000 acres. In the absence of private enterprise all these seeds have to be grown and supplied by the Department. Through the success achieved by the introduction of improved implements, methods of cultivation, combating crop pests and the selection of seeds well suited to Punjab climate and soils, the Agricultural Department is now beginning to enjoy the confidence of the farmers. It is through untiring efforts against adverse climatic conditions that the successful cultivation of American cotton has now been established. The exhibits of acclimatised American cotton, country cotton, wheats, grams and cereals, etc., serves to show the progress made and the degree of excellence achieved.

Art Industries.

The people of the Punjab have ever shown themselves skilled craftsmen. They travel far afield, and their skill is welcomed in many provinces and States of India. The formation of the Punjab Arts and Crafts Depot in Lahore, under the aegis of the Mayo School of Arts, three years ago, has done much to promote improved design, construction and finish. This institution provides the cottage workers with designs and objects made therefrom to form a standard of good work, and through its close touch with the public in India and the buyer abroad, it is able to place orders direct with the craftsmen, to see that every article is of high standard finish for the price, that it is supplied to time and contract, and through this organisation to put the workers in a healthy position of independence and prosperity. The exhibits in this section are collected from all over the province and Delhi, and whether exhibited by private firms or the Arts and Crafts Depot, every effort has been made to make them representative of the best work now being done in the Punjab if the work is modern, or the best specimen now obtainable if the work is old. Only works that have been mainly made in the Punjab, the North-West Frontier Provinces or Delhi, have been permitted to be exhibited here. It will be seen that the Mayo School of Arts' staff and students in Lahore have been responsible for the whole of the designs and decorations of the Punjab Court, for the execution and construction of the central building

in it, besides many other exhibits, and that the mural decorations of the Court have been done on the spot by students of the School of Arts brought over to England for the purpose. These decorations are historically accurate to the style and colour of the seventeenth century mosaic tile work to be seen in Lahore. The animal panels are full-size facsimile drawings of those in the Lahore Fort. The floral panels and spandrels, or the geometric borders and columns, will be found either to represent accurately the tile work of the Fort, the Wazir Khan Mosque, and other historical buildings, or to be designed in the style of those decorations. The accurate miniature painted model of the Wazir Khan Mosque's west front exhibited in the Court will give an idea of the appearance of this beautiful building. It is rightly considered to be the finest example of this style of Moghul architecture.

| Articles Exhibited. | | | | | Name of Exhibitor. | |
|-------------------------------|----|----|----|----|--------------------------|-----|
| Agriculture— | | | | | | |
| CEREALS— | | | | | | |
| Wheat (11 types) | .. | .. | .. | .. | Agricultural Department, | |
| Rice (6 varieties) | .. | .. | .. | .. | Punjab. | |
| Maize (3 varieties) | .. | .. | .. | .. | Do. | do. |
| Great millet (3 varieties) | .. | .. | .. | .. | Do. | do. |
| Bulrush millet (3 sorts) | .. | .. | .. | .. | Do. | do. |
| Small millet (4 sorts) | .. | .. | .. | .. | Do. | do. |
| PULSES— | | | | | | |
| Gram (10 types) | .. | .. | .. | .. | Agricultural Department, | |
| Lentil (2 sorts) | .. | .. | .. | .. | Punjab. | |
| Peas (3 sorts) | .. | .. | .. | .. | Do. | do. |
| Mung | .. | .. | .. | .. | Do. | do. |
| Mash | .. | .. | .. | .. | Do. | do. |
| Phaseolus aconitifolius | .. | .. | .. | .. | Do. | do. |
| Common pea | .. | .. | .. | .. | Do. | do. |
| Pigeon pea | .. | .. | .. | .. | Do. | do. |
| OILSEEDS, OILS AND OIL CAKES— | | | | | | |
| Rape (3 varieties) | .. | .. | .. | .. | Agricultural Department, | |
| Mustard | .. | .. | .. | .. | Punjab. | |
| Cotton seed (2 varieties) | .. | .. | .. | .. | Do. | do. |
| Sun-flower | .. | .. | .. | .. | Do. | do. |
| Brassica campstris, var Toria | .. | .. | .. | .. | Do. | do. |
| Rocket | .. | .. | .. | .. | Do. | do. |
| Linseed | .. | .. | .. | .. | Do. | do. |
| Castor | .. | .. | .. | .. | Do. | do. |
| Sesamam (2 sorts) | .. | .. | .. | .. | Do. | do. |
| NARCOTICS— | | | | | | |
| Opium | .. | .. | .. | .. | Agricultural Department | |
| Indian hemp | .. | .. | .. | .. | Punjab. | |
| Tobacco | .. | .. | .. | .. | Do. | do. |

Agriculture—*contd.*

| Articles Exhibited. | Name of Exhibitor. |
|----------------------------------|--------------------------|
| FIBRES— | |
| Cotton (acclimatised) | Agricultural Department, |
| American (11 types) | Punjab. |
| Cotton country (8 types) | Do. do. |
| San (hemp) | Do. do. |
| Hibiscus canuabirus | Do. do. |
| Date palm | Do. do. |
| Saccharum sara | Do. do. |

DRUGS AND SPICES—

| | |
|-------------------------|--------------------------|
| Sixty-two sorts | Agricultural Department, |
| | Punjab. |

DATE PALM PRODUCTS—

| | |
|--|--------------------------|
| Fruits, leaf mats, baskets, etc. | Agricultural Department, |
| | Punjab. |

PRESERVES.

| | |
|---|-----------------------|
| Fruits (preserved and crystallised) | Haranain Gopi Nath, |
| Chutneys | Delhi, and |
| Pickles | Behari Lal Khasi Ram, |
| Sweets, etc. | Delhi. |

FODDERS.

| | |
|------------------------|--------------------------|
| Veitch (field) | Agricultural Department, |
| Great millet | Punjab. |
| Meblet | Do. do. |
| Maize | Do. do. |
| Fenugreek | Do. do. |
| Paucum | Do. do. |

FOREST PRODUCTS.

| | |
|---|---|
| Section of pine tree showing method of collecting the crude resin | The Jallo Resin and Turpentine Factory, Punjab. |
| Specimens of resin from five resin-yielding pines of India | London Agents, Bowring, Jones & Tidy, Ltd., 52, Leadenhall Street, E.C.3. |
| Turpentine obtained by the ordinary commercial process from the above | Do. do. |
| Crude resin from <i>Pinus longisulus</i> | Do. do. |
| Resin prepared for distillation | Do. do. |
| Jallo turpentine, quality 1 | Do. do. |
| Do. do. 2 | Do. do. |
| Specimens of various constituents obtained from Indian resin and turpentine | Do. do. |
| Resin oil produced in India | Do. do. |

SOILS.

| | |
|--|----------------------------------|
| Thirty-nine different kinds with analytical tables | Agricultural Department, Punjab. |
|--|----------------------------------|

Agriculture—contd.**ENTOMOLOGICAL SECTION.***Pests—*

| | |
|-----------------------|--------------------------|
| Horticultural | Agricultural Department, |
| Citrus | Punjab. |
| Cotton | Do. do. |
| Silkworm | Do. do. |
| Sugar-cane | Do. do. |
| Stored grain | Do. do. |
| Ear cockle | Do. do. |

MACHINERY AND IMPLEMENTS.*Drills—*

| | |
|---|-------------------------|
| Kharif, Rabi and automatic seed drills .. | Agricultural Department |
| | Punjab. |

Ploughs—

| | |
|--|---------|
| Desi, Muni, Meston and Raja ploughs .. | Do. do. |
|--|---------|

Models—

| | |
|--|---------|
| Power boring plant | Do. do. |
| Charsa (ordinary type) | Do. do. |
| Do. (self-delivering type) | Do. do. |
| Hand water lift | Do. do. |
| Persian wheel (wood) | Do. do. |
| Do. (metal) | Do. do. |
| Flour grinding mill | Do. do. |
| Oil press | Punjab. |
| Sugar-cane crushing machine (wood) .. | Do. do. |
| Do. do. (metal) | Do. do. |
| Country bullock cart (ordinary type) .. | Do. do. |
| Do. do. (improved type) | Do. do. |
| Hand boring plant | Do. do. |
| Tube well, strainers and parts (wire and hardware) | Do. do. |

HAND IMPLEMENTS.

| | |
|--|----------------------------------|
| Agricultural hand implements as used by the Zeminders of the Punjab from time immemorial up to the present day, with improved types introduced within recent years or now being experimented with, including different types of ploughs, harrows, drills, etc. | Agricultural Department, Punjab. |
|--|----------------------------------|

MAPS AND DIAGRAMS.

| | |
|--|--------------------------|
| Area under American cotton in the Punjab | Agricultural Department, |
| Do. Cotton | Punjab. |
| Do. Fodder crops | Do. do. |
| Do. Gram | Do. do. |
| Do. Indigo | Do. do. |
| Do. Main crops | Do. do. |
| Do. Maize | Do. do. |
| Do. Millers | Do. do. |
| Do. Rapes and toria | Do. do. |
| Do. Sugar-cane | Do. do. |
| Do. Wheat | Do. do. |



THE SIKH TEMPLE

“SRI GURDEWARA SAHIB.”

THE architecture of the Temple is purely in Oriental Sikh style, and it is the finest Sikh Temple after the famous Golden Temple of Amritsar.

This Temple was erected by public subscription and liberal donation and help by the Kapurthala State under the order of His Highness Maharajah Jagtjit Singh Sahib Bahadur of Kapurthala by Sirdar Kanshi Ram, State architect.



VERSAILLES OF INDIA

“The Jagtjit Palace of Kapurthala”

THIS Palace was constructed in 1908 and took seven or eight years to build. The plans were made in accordance with the requirements and suggestions of H.H. Maharajah Jagtjit Singh Sahib Bahadur of Kapurthala by Monsieur Marcel, one of the leading architects of Paris and carried out by Indian craftsmen.

The big reception rooms were decorated and furnished in Louis XIV style by the leading firms of Paris and London. The Durbar Hall with its magnificent ceiling and beautiful carvings is the finest room in the Palace ; this room was planned and decorated in true ancient Indian style by the workmen of the Kapurthala State, it is 50 ft. square by 50 ft. high.

The Palace with its magnificent Park is unique of its kind in India and cost about £1,000,000.

Agriculture—cont.

| Articles Exhibited. | Name of Exhibitor. | |
|---|--------------------|-----|
| Cattle, buffaloes and animals other than bovine | Do. | do. |
| Classification of area in the Punjab | Do. | do. |
| Export of rapes and mustard seeds from the Punjab | Do. | do. |
| Export of wheat from the Punjab | Do. | do. |
| Livestock in the Punjab | Do. | do. |
| Total area irrigated from all sources in the Punjab | Do. | do. |
| Total area cultivated in the Punjab .. | Do. | do. |
| Export of raw cotton from the Punjab .. | Do. | do. |
| Typical arrangement of a tube well | Do. | do. |

Art Industries.

JULLUNDAR AND HOSHIARPUR WOOD WORK.

Brass, copper and ivory inlaid tables, tea- Arts and Crafts Depot,
trays, cakestands, screens, boxes, toys, etc. Punjab.

JULLUNDAR AND HOSHIARPUR LACQUER WORK.

Mayo School of Arts pattern—

Electric light standards, candlesticks, powder Arts and Crafts Depot,
boxes, pot pourri bowls, trinket boxes, etc. Punjab.

Country pattern—

Vases, trinket boxes, candlesticks, electric Do. do.
light standards, etc.

DERA GHAZI KHAN LACQUER WORK.

Electric light standards, candlesticks, vases, Arts and Crafts Depot,
vanity boxes, ornaments, etc. Punjab.

CHINIOT WOOD WORK.

Brass and copper inlaid tables, screens, trays, Mangaldev Dhanpatrai
boxes, etc. & Co., Delhi Gate,
Multan.

CARVED IVORY WORK.

Carved boxes, caskets, pierced and carved trinket Arts and Crafts Depot,
boxes, elephants with howdahs, bullock carts, Punjab.

state carriages, paper knives, napkin rings,
scent sprinklers, chased and coloured boxes,
cigarette holders, slave bangles, necklaces,
animals (large and small), chessmen, etc. ..

Carved and pierced boxes in low and high relief, Faqir Chand Rad-
ivory and ebony animals, ornaments, minia- hunath Das, Delhi.
tures of Indian scenes and buildings.

MODELLED BIRDS, ANIMALS AND FRUITS.

Life-like painted models of tame and wild birds Arts and Crafts Depot,
of the province, in various sizes and groups, in Punjab.
burnt clay ; fruits, nuts, and vegetables.

MAYO SCHOOL OF ARTS WOOD-CARVINGS.

Construction—

Carved panelled office in centre of Court .. Mayo School of Arts,
Carved panelled fourfold teakwood screen .. Punjab.

Arts and Industries—*contd.*

| Articles Exhibited. | Name of Exhibitor. |
|---|--|
| BRASS WORK. | |
| Palm bowls, finger bowls, trays, candlesticks, Rohtak stands and tables | Arts and Crafts Depot, Punjab. |
| DAMASCENED STEEL " KOFTGARI WORK." | |
| Ash trays, cigar and cigarette boxes, salvers, paperknives, photograph frames, vases, etc. | Arts and Crafts Depot, Punjab. |
| TEXTILES. | |
| <i>Carpets—</i> | |
| Amritsar Pashmina and Fine wool | Arts and Crafts Depot, Punjab. |
| (Note.—Pashmina is the fine wool obtained from the Pashmina goat.) | |
| Fine wool pile carpets and rugs | Central Jail and Mont- gomery Jail. |
| Handwoven thick pile wool carpets from Multan | Abdul Haq, Multan. |
| Lahore reversible cotton durries and mats .. | Arts and Crafts Depot, Punjab. |
| LAHORE BLOCK PRINTING ON COTTON. | |
| Curtains, bedspreads, cushion covers, table covers etc. | Arts and Crafts Depot, Punjab. |
| Multan block printed cottons | Do. do. |
| EMBROIDERIES. | |
| Delhi gold, silver and coloured embroideries on silk, satin and velvet, shoes, shoe ornaments, vanity bags, etc. | Arts and Crafts Depot, Punjab. |
| Amritsar wool embroidery on cotton | Do. do. |
| Gold, silver and coloured embroideries, panels, table covers, cushion covers, on satin and velvet, embroidered shoes, shoe ornaments, vanity bags and ornaments. | Kishen Chand, Delhi. |
| MUSLINS—Rohtak. | |
| Gold woven scarfs, turbans, and dress materials | Arts and Crafts Depot, Punjab. |
| SHAWLS. | |
| Plain, coloured and embroidered | Arts and Crafts Depot, Punjab. |
| SILKS. | |
| <i>Lahore Multan Shot Silk.</i> | |
| Cotton and silk fabrics, woven pattern silks, handkerchiefs, scarves, etc. | Arts and Crafts Depot, Punjab. |
| THREAD (GOLD AND SILVER). | |
| Case showing the stages of manufacture of gold, silver and coloured threads used in Indian embroideries | Kannuji Mathumal, Delhi. |

| Articles Exhibited. | Name of Exhibitor. |
|---|--|
| Fine Arts. | |
| ARCHITECTURE. | |
| Model in facsimile of Western Front of Wazir Khan Mosque, Lahore, showing its seventeenth century Mosaic tile decoration | Mayo School of Arts, Punjab. |
| Model of H.H. The Maharajah of Kapurthala's palace | H.H. Maharajah of Kapurthala. |
| Model of Sikh Gurdwara in the State of Kapurthala | Do. do. |
| MODELLING. | |
| Five modelled groups of Punjabi craftworkers, showing their methods in working in metals, pottery, lacquer turning, weaving and spinning, executed in terra cotta | Mayo School of Arts, Punjab. |
| PAINTINGS. | |
| Coloured rawings and scale elevations of some of the principal buildings in Lahore | Mayo School of Arts, Punjab. |
| DECORATIVE PAINTINGS. | |
| Mural decorations of the Punjab Court, executed in tempera from drawings and designs based on the seventeenth century Moghul mosaic tile work of the Fort and Wazir Khan Mosque, Lahore | Mayo Achool of Arts, Punjab. |
| MANUFACTURES. | |
| SPORTS GOODS. | |
| Cricket bats and balls, ground matting, practice nets, and pads | Uberoi, Ltd., Sialkot City. London Agents— |
| Footballs and bladders, pads, etc. | Samuel Fitze & Co., |
| Hockey sticks, balls, netting and pads | 91, Bishopsgate, E.C.2. |
| Presses, nets, poles, screens and boundary nets | Do. do. |
| Tennis racquets of many exclusive patterns to firms' patents | |
| METALWORK. | |
| Steel desptach boxes, jewel cases, cash boxes with leather cover cases | Allihboy Vallijee, Multan. |
| MISCELLANEOUS. | |
| Camp chairs with woven carpet seats and backs | Central Hall, Multan. |
| Huckaback and honeycomb towels | Do. do. |
| Palm tree products—Baskets, mattings, etc. | Agricultural Department, Punjab. |
| Fine floor matting | Montgomery Jail, Punjab. |
| Reed and bamboo window and door chicks | Do. do. |
| Huckaback and honeycomb towels | Do. do. |

Irrigation Department—**MODELS—**

Model of the Mangla Regulator, Upper Jhelum Canal Head, 6 ft. by 12 ft. This model represents an installation comprised of 20 openings, each being provided with three "Stoney" gates, the span of each opening being 12 ft., the depth of the top gate 8 ft., the middle gate 6 ft. 6 ins., and bottom gate 6 ft. 9 ins. For purposes of operation the openings are arranged in five groups of four openings each. To each group of four there is a master operating crab, from which a complete line of four gates can be operated either singly or collectively. Each gate is separately counterbalanced.

Ransomes & Rapier,
Ltd., Ipswich.

Model of the Suketer Level Crossing, made in India. Size of model, 15 ft. by 10 ft. 6 ins.

Irrigation Department,
P.W.D., Lahore.

Description to follow—

Working model of one of the Level Crossing Gates to the above model, showing the method of operating. Made in Ipswich.

Messrs. Ransomes &
Rapier, Ltd., Ipswich.

Size and description to follow—

MAPS—

Series of maps showing the periodic expansion of the irrigated area of the Punjab as a result of the various canal projects introduced by the Irrigation Department

Irrigation Department,
P.W.D., Lahore.

PLANS—

Plans and elevations showing the constructional canal works undertaken and completed

Irrigation Department,
P.W.D., Lahore.

DIAGRAMS—

Diagrams showing the area under cultivation, increases in population, etc., in the Province during the last 50 years.

Irrigation Department,
P.W.D., Lahore.

PHOTOGRAPHS—

Photographs of scenes of construction work projected, in course of construction, or completed

Irrigation Department,
P.W.D., Lahore.

BIHAR AND ORISSA

BIHAR and Orissa is 11,809 square miles in area, with a total population of nearly 38 millions. Of this British territory accounts for 83,000 square miles and a population of 34,000,000, the balance being covered by the Feudatory States of Chota Nagpur and Orissa. Bihar and Orissa is thus fourth in point of population and sixth in point of area among the provinces of India. In age it is the youngest of the Indian provinces, being formed, by division from Bengal, at the time of His Majesty the King Emperor's visit to India in 1911. It is a long straggling province on the western boundary of Bengal, reaching from Nepal and the Himalayas on the north to the Bay of Bengal and Madras on the south. Although it has a seaboard of about 200 miles, it possesses no ports of any importance, and practically the whole of its foreign trade is carried on through Calcutta.

The province falls into two fairly well-defined parts, Bihar to the north and Chota Nagpur and Orissa to the south. Bihar proper is a purely agricultural tract which, except on the northern and southern borders, is formed by the alluvial plain of the Ganges and its tributaries. Every available acre is cultivated by the teeming population, and, save in two districts, there is little or no forest, and hardly any pasture land. The main crop is rice, but it also produces large quantities of oil seeds, chiefly linseed and rape, barley, sugar cane and tobacco, as well as several kinds of millet and cheaper food grains. Such industries as it possesses, or is likely to possess, must, as a general rule, be based on agricultural products or the needs of an agricultural population. The chief of these at present are sugar making, oil pressing, indigo manufacture, the production of saltpetre and sodium sulphate from the efflorescence of the soil and engineering works, which supply material for these or for the railways. Rice hulling is rapidly becoming an industry of importance, while the handloom industry gives employment to a very large number of persons. Great openings exist for the development of the manufacture of white sugar and tanning. In the south where the plain touches the hills, there is a lime and cement industry in the course of development, while mica, coal and china clay are mined in small quantities.

Chota Nagpur and Orissa, except for a small alluvial area along the coast of the Bay of Bengal, which is almost entirely a rice-growing tract, forms a great contrast to Bihar. It consists mainly of uplands with a laterite soil, and is intersected with ranges of low hills. Its population is sparse and, except in Orissa, largely aboriginal. The land is far less fertile than the Ganges valley, but, wherever water is available, produces excellent crops of rice. The chief importance of this area, however, is that it is the great mineral region of India. Of the coalfields now worked those in Bihar and Orissa yield nearly 70 per cent. of the total output in India, while, if the Raniganj field, on the border of Bengal, is added, the production in the two provinces would amount to no less than 90 per cent. of the whole. In addition to the existing fields, large quantities of first-class coal have been located to the west, and these are now in process of exploitation. Again, in Chota Nagpur there have already been found hundreds of millions of tons of rich iron ore averaging over 60 per cent. of iron, and in some cases as much as 67 per cent. Besides iron and steel, copper, limestone, fire-clay, mica and other minerals are available.

Thus it is clear that this area is destined to become one of the great mineral regions of the world. The famous Tata Iron and Steel Works, which is now one of the largest iron and steel works in the world, is located at Jamshedpur in the Singhbhum district, while two other concerns producing

pig-iron on a large scale from raw materials produced in Bihar and Orissa, the Bengal Iron Co., and the Indian Iron and Steel Co., are situated just across the border in Bengal. Other iron and steel works are contemplated, while the Cape Copper Co. and the Cordoba Copper Co. are engaged in exploiting the vein of copper which runs across the east of the area. The former company is now in difficulties, but prospects of the latter seem very good indeed. Subsidiary industries have also sprung up, especially those for the production of refractory materials, such as fire bricks, silica bricks, etc., and their products are now quite equal to those imported from abroad. Factories which use the iron and steel produced at Jamshedpur are also springing up there. Tin-plates, agricultural implements, steel wire, electrical cables and enamelled ironware are already being made. Coke is also produced in by-product ovens, and a large quantity of ammonium sulphate and tar are manufactured, most of the former being exported to Java for use in the sugar industry.

The other important existing industries are the production of lac and shellac, the mining of mica and the hand-weaving industry. India supplies over 70 per cent. of the world's mica, and more than three-fourths of her contribution is mined on the borders of Bihar and Chota Nagpur. Lac is almost an Indian monopoly, although it is produced in relatively small quantities in the west of China, Indo-China, Siam and the Straits Settlements. Here again the great bulk of the lac produced in India, that is, over 86 per cent., comes from Chota Nagpur and Orissa and its fringe areas. The value of the industry to the province may be gauged from the fact that the exports from India in the last year are recorded at nearly seven million pounds sterling. The handloom industry is still the most important industry in the province as a whole in point of persons actually employed. There are some 160,000 looms at work, and these employ quite half-a-million persons, and produce on the average about 60,000,000 yards of cloth annually, worth not less than one and a-half million pounds.

Various difficulties have made it impossible for the province of Bihar and Orissa to maintain a provincial court. The chief of these is that the province is little interested in an export trade, and the firms engaged in industries were unwilling to incur the great expense of advertising in a distant country in a manner worthy of their business. Apart, therefore, from the Government arts and crafts stall, the only exhibitors in this section are the Indian Lac Association and the Indian Indigo Association, whose products do not need separate description. The Government arts and crafts stall is exhibiting mainly silks made on handlooms in Bhagalpur and lace produced in the convent at Ranchi. These silks will at once attract the eyes of the visitors. Their main novelty lies in the use of some of the wild silks of India, such as *eri* and *muga* for the production of new colour effects. Many people have heard of or have seen the thick Assamese silks, but probably none have realised what wonderful effects can be obtained by mixing the various sorts of silks and by applying dyes to them. These silks ought to have a great future for use in artistic decoration. The lace produced in Ranchi is the result of the teaching of the Belgian Sisters of the Jesuit Mission, and is said to be equal in all respects to the best products of Europe, while it is produced at prices with which European labour cannot compete. The other articles in the stall do not need special description. They include silverware from Cuttack and Monghyr and an attractive form of black stone ware from Gaya. The Feudatory States of Orissa have also sent a number of articles which they produce, and among these the axes inlaid with silver and gold, the models of temples in silver and gold and articles of ivory and wood will attract special attention.

| Articles Exhibited. | | Name of Exhibitor. |
|---|----------------------------------|--|
| TEXTILES AND LACES— | | |
| Handmade lace (in different colours) | Tea cloths | } Ursuline Convent Lace School, Ranchi. |
| Handkerchiefs | Boudoir caps | |
| D'oyleys | Jumpers | |
| Table centres | Frocks | |
| Tray cloths | Cloth for decorative purposes | |

SILKS—

| | | |
|-----------------------------------|--|---|
| Tussore suiting | Dress pieces | } (1) Weaver's Co-opera- tive Stores, Bhagalpur |
| Tussore and spun silk suitings | Eri silk rugs | |
| Tussore and linen suitings | Eri silk shawls | |
| Shirtings | Eri silk scarves | |
| | Clothing materials made from eri and muga silk | |

LEATHER AND LEATHER GOODS—

| | | | | | | |
|---------------------------|----|----|----|----|----|---|
| Lizard skins | .. | .. | .. | .. | .. | } Swedish Tannery, Cuttack. Hazaribagh National Shoe Stores. |
| Chocolate leather Derbies | .. | | .. | .. | .. | |
| Boots | .. | .. | .. | .. | .. | |
| Shoes | .. | .. | .. | .. | .. | |

HORN TOYS—

| | | | |
|--------------|--------------|------------------------|--|
| | Specimens of | | |
| Snake | Powder boxes | } D. N. Sur & Brothers | |
| Flower vases | Paper knives | | |
| Palanquins | Penholders | | |
| Almirahs | Combs | | |

SILVERWARE AND GOLD ORNAMENTS—

| | |
|--|-----------------------|
| Silver fishes (various sizes and designs) | Gold brooches |
| Silver beads | Gold-plated necklaces |

FILIGREE WORK FROM CUTTACK—

| | |
|---------------|-------------------|
| Silver girdle | Samusas |
| Rose buttons | Silver trays |
| Hairpins | Rose silver trays |
| Brooches | |

GAYA STONEWARE—

| | |
|--------|-------------------|
| Plates | Dolls |
| Bowls | Model of elephant |
| Images | |

BARODA

BARODA State, the territory of His Highness the Maharaja Gaekwad, is situated between 20-45' and 21-42' N. latitude, and between 70-45' and 71-22' E. longitude, excepting a small portion called Okhamandal, which lies between 22-5' and 22-35' N. latitude, and between 69-5' E. longitude. These territories are interspersed with others, owning British or other sovereignty, from the northern extremity of the Thana District of the Bombay Presidency in the south to Palanpur in the north, and from the western limit of the Nasik District in the south-east to the extreme north-east of Kathiawad.

Area.

The area of the State is 8,127 square miles. Compared with European countries the Baroda State is larger than Wales by 900 square miles, and greater than two-thirds of Belgium.

Population.

The population, according to the census of 1921, is 2,126,522.

Occupation.

Agriculture is the principal occupation and engages two-thirds of the total population. There is no extraction of minerals worth the name. Twenty per cent. of the population are maintained by the preparation and supply of material substances.

Export and Import.

Agriculture being the most important industry of the State, there is a large yield of cereals and pulses, wheat, oil-seeds, cotton, tobacco and other crops. Most of the foodstuffs are consumed locally, but the commercial crops, such as oil-seeds, cotton and tobacco, are exported either to other parts of India or foreign countries. Navsari cotton, Petlad tobacco, and the yellow rape and castor of the Kadi District, have a widespread fame of their own, and command good prices.

Forest Produce.

The State has about 630 square miles of forests. They provide the building and other materials required for the domestic and the industrial life of the people, and are also of great value in the preservation of moisture and in the gradual feeding of the rivers, which rise in the protection which their shade affords. The forests of Baroda are noted for their valuable timber, samples of which, in the shape of booklets and panels, polished and unpolished, have been exhibited. (Nos 7 to 10.)

Industries : Weaving.

A number of small industries exist throughout the State. Among these weaving is of ancient repute, and is carried on by artisans, mostly in their own homes. Dheds and other weavers manufacture that coarse and inferior cloth called *Khadi*, which is worn by the poorer classes and, under the pressure of modern political enthusiasm, even by the comparatively wealthy. Fine *dhori*, *saree*, *basta* and *bafta* made in the towns of Navsari and Gandevi were in great demand at the Portuguese, Dutch and English factories in Surat in the seventeenth and eighteenth centuries for export to Europe, and in 1788 Doctor Hova, an English traveller, visited Gandevi to learn the art from Parsi weavers. The industry practically died out early in the nineteenth

century, but Parsee women still manufacture *kasti*, worn by both sexes, and are skilful in making ornamental borders for *sarees*. In the Baroda District there is a considerable industry at Dabhoi, where fine turbans are prepared. Good sarees, coating and shirting cloth are manufactured at Petlad, Vaso and Amreli. In the Kadi District, Patan, the old capital of Gujerat, was famous for its weaving industry. Unfortunately a great part of the trade has been transferred to Ahmedabad, but the slowly decaying weaving community of Patan still produces a superior quality of cloth, for which they find a good sale. During recent years a good number of cotton spinning and weaving mills have been started in the State which manufacture cloth similar to that imported from foreign countries. A woollen mill has also been started, and turns out excellent rugs, tweeds and shawls.

Patola Silk Cloth.

Silks, however, are the speciality of Patan, and the silk *patolas* of this town are in great demand in all parts of Gujerat, worn as they are by high caste Hindu women on marriage occasions. Of late there has been a good demand for them among Europeans for decorative purposes, such as table-cloths, tea-poy covers, tablecloth curtains, etc., and such articles of *patola* cloth have therefore been exhibited in the Baroda Court. The peculiar way of preparing the warp and weft used in *Patola* gives it an appearance as if it was a double cloth. In the machine-made double cloth, if we examine a figure at a particular place, we would find both the sides to be of equal colour. The same would be in the case of the *Patola* cloth. However, it is not a double cloth. *Patola* cloth is a single cloth with the same colours in a particular design on both sides. Floral and animal patterns are created in weaving *Patolas*, and if any particular animal or flower be examined from both sides there will be the same colour on each side. This is not done by printing, but by weaving. As said before, it is the peculiar way of preparing the warp and weft that gives this effect. Warp and weft are tied into knots according to the design to be woven, and then dyed into different colours. While weaving the weaver has to be very careful to unite a particular colour in weft with that in warp, or else the design would not be clear.

It is pure hand work and cannot be tried on any machine.

The harmonious effect of various colours and the various small animal and floral designs woven in it give to the *Patola* a pleasing appearance.

Embroidery.

Some embroidery in gold, silver and silk is done in Baroda, Navsari and Amreli, and the work, both in pattern and execution, is of a superior kind, as will be seen from the samples exhibited. (Nos. 58 to 188.)

Dyeing and Calico Printing.

Dyeing and calico printing in red, indigo and black, are old industries carried on in almost all the important towns. (Nos. 38 to 40 and 52 to 57.)

Carpets.

Excellent carpets and bedspreads are made at Baroda in the original Persian, Turkish and other designs. The floral, bird and crocodile pattern carpets are in good demand, and have therefore been exhibited. (Nos. 182 to 206.)

Lacquer Work.

Sankheda, in the Baroda District, is famous for its lacquer work. Its peculiarity lies not in the shape or design of the articles, but in the varied brilliant lacquer colours and drawings in silver and golden tints on them. These colours are fast and do not fade. Various articles used for home

decorations are prepared. They may be small or big, flat or round. Articles with flat surfaces are manufactured, but generally round-shaped things which can be turned very easily on a lathe are preferred, as they entail less time and labour, and, in addition, give excellent finish. All the work—turning, painting and lacquering—is done by hand.

Fig. 1 shows some of these lacquered articles. The big figure is a full-sized cradle, but as it is not in colour it does not give an adequate idea of the attractive lacquered work; it simply shows the shape of the cradle. It is quite a different thing to see the articles themselves with their brilliant colours and golden drawings of various designs, which present a beautiful and pleasing appearance.

Nos. 2 to 5 in the same plate represent a water jug, a flower pot, water pots, and a circular box respectively. All these articles are exhibited in the Baroda Court. (Nos. 145 to 176.)

Cane Work.

Good work baskets of cane are made at Baroda, and are exhibited. (Nos. 138 to 144.)

Wood Carving.

Wood carving of a superior quality is done at Baroda, Patan, Kadi, Visnagar and Billimora.

Wood Carved Articles.

The town of Visnagar, in the Kadi District, turns out articles of workmanship which are much appreciated by Europeans for table decoration. As shown in Figs. 3 to 15, models of various kinds of animals are carved out of teak or black wood, such as the camel, buffalo, lion, etc. The models of animals are also utilised as table stands, bowl stands, and such other useful articles. The carving work is done so accurately as to make the articles look life-like and pretty.

Fig. 3.—A folding camel table of teak wood, octagonal in shape.

Fig. 4.—Another folding camel table, with the top with round corners.

Fig. 5.—A folding elephant table with oval top.

Fig. 6.—A camel bowl stand made of black wood.

Fig. 7.—An elephant bowl stand of black wood.

Fig. 8.—A buffalo bowl stand of black wood.

Fig. 9.—A three camels bowl or lamp stand of black wood.

Fig. 10.—A three elephant bowl or lamp stand.

Fig. 11.—A three stork bowl or lamp stand.

Fig. 12.—A lion, lioness and bear stand.

Fig. 13.—A salad bowl with 2 silver rings, and with spoon and fork.

Fig. 14.—A carved elephant buffalo picture frame. It is made to hold a picture 6 ft. by 8 ft. or 8 ft. by 10 ft., and is prepared either of teak or black wood.

Fig. 15.—A carved black wood picture frame to contain a cabinet-size photo.

Fig. 16.—A full-size screen. It is supported on two elephants. Note the fine carved work. A good many other good carved articles are prepared, and some of them are exhibited here. (Nos. 244 to 261.)

Pottery.

Pottery is an extensive industry in a country where the mass of the people use earthenware for cooking and storing drinking water, and for other domestic purposes. Patan is famous for its ornamental pottery, some samples of which have been exhibited. (Nos. 208 to 213.)

Brass and Copper Ware.

Dabhoi and Petlad, in the Baroda District, and Kadi, Visnagar and Patan, in the Kadi District, are known for their brass and copper ware. Sheets of copper and brass are imported from Europe for the work, and the articles made are of ordinary household use among the people.

Stools of Wood inlaid with Brass and Copper.

Visnagar is famous for its excellently-made stools of wood inlaid with brass, copper and silver, richly ornamented (Fig. 2). The stool has four legs with the shape of a tiger's paw and a square seat on the top. First of all, all the parts are prepared from teak or black wood, and then they are carved. Carving work is really artistic, and it is done purely by hand. Various designs are wrought on the top as well as on the legs, and the parts are then covered over by thin brass or silver sheet, which is set in the carved spaces by means of small hand tools. When the whole is complete it appears as if the stool were made of solid brass. It requires time and trouble to get this done, and the fine carving work testifies to the skill of the artisan. The stools are in different sizes and with various designs in carving, some of which are exhibited here. (Nos. 234 to 236 and 239 to 241.)

Sale.

All the articles exhibited, except a few specially marked with green labels, are for sale, and orders may be registered with the officer in charge of the Baroda Court.

Depot at Baroda.

The marketing of the arts and crafts of the Baroda State is facilitated by the Arts Sale Depot which has been established in the State Museum at Baroda. Here lacquer work, pottery, carpets, turned and carved woodwork and numerous other artistic productions of the State, are collected and offered for sale.

Articles Exhibited.

Name of Exhibitors.

Agriculture.

FOOD PRODUCTS.

| | |
|---|--------------------------|
| Wheat of several kinds | Director of Agriculture, |
| Maps showing areas under— | Baroda State. |
| (1) Rice and wheat | |
| (2) Juwar (big millet) and Bajra (small millet) | |
| (3) Food crops, and | |
| (4) Tobacco, sugar cane and opium crops. | |

TEXTILE PLANTS.

Samples of Surat, Broach and Dholera cotton.
Samples of cotton on a cardboard.
Map showing area under cotton cultivation.

OIL SEEDS.

Sesamum (til), castor and rape seed.
Map showing area under oil seeds crops.

Timber and Other Forest Resources.**TIMBER.**

| | | |
|--|----|-------------------------|
| Panels of different kinds of timbers.. | .. | Conservator of Forests, |
| Booklets of different kinds of woods | .. | Baroda State. |

MINOR FOREST RESOURCES.

| | | |
|---|-------|---------|
| Rosa grass. | | |
| Rosa oil. | | |
| Jar made of " Darbha " grass | | Do. do. |
| Crude lac. | | |
| Fruits of " Behda " and " Harda." | | |
| Floss of " Samar " (Bombax malbaricum), | | |
| " Ankada " (Calotropis cigantea) and | | |
| " Bhutdordi (Cryptolepis buchanani). | | |
| Photographs showing tree tapping for crude | | |
| lac, and a bamboo raft on the River Tapti. | | |
| Bulletin No. 2 of the Forest Resources of the | | |
| Baroda State. | | |

Textile Manufactures.**COTTON.**

| | | |
|---|-----------|---------------------------|
| Table cloths in various designs and colours | } | Dye House Superintendent, |
| Striped cloth pieces | | Technical Institute, |
| Cotton bed covers | } | Baroda State. |
| | | Through Director of Com- |
| | | merce and Industry, |
| | | Baroda State. |
| Cotton pile carpets | } | |
| Cotton carpets | | |
| Cotton tape | | Baroda State Carpet Fac- |
| | | tory. |

WOOL.

| | |
|------------------------------|---------|
| Woollen pile carpets | Do. do. |
|------------------------------|---------|

SILK.

| | |
|---|--------------------------|
| Saries with gold border | Jadaveal Jakisondas Ks- |
| Gold thread silk saries | hatri, Pranjwan Harkisan |
| Table cloths of various designs and colours | das Kshatri, Umedchand |
| | Kanchand Salvi. |

Embroidery, Lace and Trimmings.**GOLD AND SILVER THREAD****EMBROIDERY.**

| | |
|---|--------------------------|
| Photographs of Their Majesties the King and | Through Director of Com- |
| Queen of England, H.R.H. the Prince of | |
| Wales, and Their Highnesses the Maharaja | merce and Industry, |
| and Maharani of Baroda | Baroda State. |
| Mufflers, vanity bags, blouses, table covers, | Do. do. |
| cushions with Taj Mahal and other designs, | |
| Indian dice game, slippers, and necklace | |
| of gold and silver embroidery | |

SILK THREAD EMBROIDERY.

| | |
|--|---------|
| Cushions of various designs, table cloths, | Do. do. |
| door and window curtains, and vanity bags | |

EMBROIDERY OF OTHER SORTS

| | |
|--|---------|
| Crochet vanity bags, cards with ribbons, | Do. do. |
| bedspreads, table cloths, cushions, door | |
| decorations made of beads, etc. | |

| Articles Exhibited. | Name of Exhibitors. |
|---|---|
| Tanned Leathers. | |
| Goat skin, sheep skin, calf skin and roller leather | Mahmud Abusaheb Abubaker. |
| Cane Work. | |
| Cane boxes of various designs | Baroda State Cane Factory. |
| Building Materials. | |
| Green mottled marble slabs, base and round table pieces | Chief Engineer, Public Works Department, Baroda State. |
| Briquettes of Dwarka cement | The Dwarka Cement F'ct'y. |
| Arts and Crafts. | |
| SILVER WORK. | |
| Tea sets— | |
| (1) Plain, with dead polish, and | Mathur Pitambar Mistri, |
| (2) Of snake pattern | Premji Umersi and Sons. |
| Stools of inlaid work | Raghunalh Tribhuvan and Sons, Naranlal Mohanlal, Panchal. |
| BRASS WORK. | |
| Stools of inlaid work, boxes of various shapes and designs, and wooden boxes with brass decoration | Do. do. |
| LACQUER WORK. | |
| Chairs, cradles, rulers, paper weights, trays, boxes, rose-water sprinklers, flower pots, wine cups, water pots, "Atturdani" (perfume holders), cups and saucers, walking sticks, snuff boxes, 1 lb., $\frac{1}{2}$ lb. and $\frac{3}{4}$ lb. measures, set of "Sogtha" (Indian game), and toys | Ichha Premji, Chhagan Mohan, Chita Kashi. |
| WOOD WORK. | |
| Camel tables, camel bowl stands, elephant bowl stands, Stork bowl stands, alligator pattern picture frame, and toys | Kalidas D. & Sons. |
| Flower bouquet of perfumed real flowers .. | R. H. Bana. |
| Toys. | |
| LACQUER WORK TOYS— | |
| Cuckoo, rattles, small bedsteads, balls, grinding mills, tops, and babies' trumpets and other toys | Ichha Premji, Chhagan Mohan, Chita Kashi. |
| WOOD WORK TOYS— | |
| Riding camels sitting, riding camels standing, elephants, buffaloes, lion and lioness | Kalidas D. & Sons. |
| Pottery. | |
| Tea pots, jugs, water pots and incense burners | Nathu Vithal Otio. |

Education.

Set of the Gaekwar's Oriental Series, containing 23 volumes

Commissioner of Education,
Baroda State.

STATEMENTS, showing—

- (1) Condition of girls' education
- (2) Work of school clinics
- (3) Evils of indifference of parents
- (4) Provisions made for school buildings, and
- (5) Rise in the cost of education

DIAGRAMS, showing—

- (1) Attendance per capital expenditure and total expenditure of primary, secondary and collegiate education
- (2) Percentage of school attendance in primary schools to school-going age population.
- (3) Condition of education among depressed classes.
- (4) Condition of literacy.
- (5) Measurements of school children.
- (6) Proportion of educational expenditure to the total revenue and land revenue of the State.
- (7) Fluctuations in educational expenditure.
- (8) Population of the State served by libraries and reading rooms.
- (9) Progress of free public libraries from 1911 to 1923.
- (10) Statistics of the travelling library branch.
- (11) Proportion of total stock of books in all the libraries, and their circulation to the entire literate population, and to the number of registered readers.

PHOTOGRAPHS of the College, the High School, the Technical Institute, the Women's Hostel, a primary school building, a village school building, library work with children, library department extension work, State-aided libraries' typical buildings, and of cinema shows to mill hands, and village men and women.

Commissioner of Education,
Baroda State.

MAPS showing libraries in the four districts of the State.

Do. do.

Social Economy.

CO-OPERATION—

Statements and diagrams of progress in the Registrar of Co-operative
Co-operative Movement, showing :— Societies, Baroda State.

- (1) Number of societies.
- (2) Number of members.
- (3) Working capital.
- (4) Deposits, and
- (5) Reserve funds.

| | |
|--|--|
| Chhugan Mohan Kharadi, Sankheda, Baroda District, India | Lacquered articles. |
| Chita Kashi Kharadi, Sankheda, Baroda District, India | Lacquered articles. |
| Chunilal Kevaldas Kshatri, Patan, N. Gujarat, India. | Satin cloth. |
| The Conservator of Forests, Baroda State, Baroda, India. | Timbers and minor forest produce. |
| The Dwarka Cement Co., Dwarka, Kathiawar, India. | Cement manufacture. |
| The Director of Agriculture, Baroda State, Baroda, India. | Cotton, oil, seeds, serials, etc. |
| Iecha Premji, Kharadi, Sankheda, Baroda District, India. | Lacquered articles. |
| Jadavlal Jekisondas Kshatri, Wadi, Baroda, India | Gold thread cloth. |
| Kalidas, D., & Sons, Visnagar, N. Gujarat, India | Carved animals and other articles. |
| Mathur Pitambar Mistri, Amreli, Kathiawar, India. | Silverware. |
| Mahomad Abusaheb Abubaker, Ganjkhana, Tannery, Baroda, India. | Tanned skins. |
| Naranlal, Mohanlal Punchal, Kadi, N. Gujarat, India. | Brass articles. |
| Natha Vithal Otia, Patan, N. Gujarat, India .. | Pottery. |
| Pranjivan Harikrishna Kshatri, Wadi, Baroda, India. | Gold thread cloth. |
| Premchand Vandhravan Kshatri, Patan, N. Gujarat, India. | Satin cloth. |
| Premji, Umersi & Sons, Baroda, India | Silver ware. |
| R. H. Bana, Navsari, India | Floral bouquets of perfumed real and artificial flowers. |
| Raghnunath, Tribhovan & Sons, Visnagar, N. Gujarat, India. | Brass and silver ware. |
| Sarupchand Uttamchand Mashruwala, Patan, N. Gujarat, India. | Satin cloth. |
| The Carpet and Cane Work Factory, Baroda State, Baroda, India. | Carpets and cane baskets. |
| Umedchand Kauchand Salvi, Patan, N. Gujarat, India. | Patola silk sari and table cloths. |

BHARATPUR

Area : 2,000 square miles.

Population : 500,000.

Ruler : His Highness Maharaja Shree Brijendrar Sawai Kishen Singh Bahadur, Bahadur Jung of the Sinsinwar Jat Race.

SITUATION

BHARATPUR State is the Eastern gate to Rajputana and is situated close to the British districts of Agra and Muttra in the United Provinces and Gurgaon district in the Punjab. It is served by two big railways—the Rajputana Malwa Railway and the Bombay Baroda and Central India Railway, the latter joining it by direct route with the ports of Bombay, Calcutta and Karachi.

AGRICULTURE

The soil is generally fertile and yields two crops in the year by rotation. The autumn crop produces jawar, bajra, maize, pulses of different kinds and oilseeds, such as sesamum, mustard seed, castor seed, etc. Tobacco and cotton are also grown in sufficient quantities. The spring crop produces wheat, grain and barley, which are exported in large quantities to the surrounding markets. The average annual rainfall is 24 ins. The occupation of the people is mostly agriculture. The population consists chiefly of Jats and Gujars, both of them a sturdy race, who are well up in agricultural pursuits and cattle breeding and make very excellent soldiers. About one-fourth area of the State is preserved as forest, which abounds in timber. Specimens of different varieties of timber and other wood that grows in State forests are exhibited in the State Court.

SALT & SALTPETRE

Bharatpur was once famous for its salt obtained from sub-soil water by means of digging wells and ponds.

TEXTILES

Alac leaves, locally called "Rambans," and moonjh-hemp grow in abundance. They yield a very fine fibre which is utilised in manufacturing carpets, floor mattings and ropes, etc.

Specimens of moonjh-hemp and aloe fibre as well as carpets and floor mattings are exhibited. Other specimens include hand-spun yarn from local wool and cotton.

SILK & WOOLLEN FABRICS

Silk and woollen cloth of a very fine quality and finish is manufactured in the State by country hand-loom process. The cloth is largely in demand for suit and shirting. It can stand comparison with machine-made cloth of the kind in quality, finish and durability. Specimens exhibited and for sale.

INDUSTRIAL ART

The State is famous in manufacturing certain things of art workmanship which is peculiar to the State and is found nowhere else in India. Very handsome fans and "Chauris" are prepared of ivory and of sandal-wood. These hand-made fans and "Chauris" decorate drawing rooms of palaces and are used as valuable presents on special ceremonial occasions.

Gold-plated garlands are another peculiarity of the State. The design and execution are purely Indian. They are put round the necks of guests on wedding and other ceremonial occasions as tokens of special honour. Specimens exhibited and for sale.

The State workshop turns out work of great artistic beauty and skill. The elephant "Howdahs" and "Jhuls" carved in gold and silver which are used on occasions of State processions are masterpieces in originality of design and execution. Photos exhibited.

STONE CARVING

The State is famous in Northern India for the excellent and fine carving work done on solid sandstone quarried in abundance from the State quarries. Some of the carvings on white stone, a local production, and used in building palaces and temples, have been declared by experts as equal in workmanship and finish to any best existing carvings in India—photos exhibited. The old palaces and forts of Moghal Emperors of India constructed in the 16th and 17th centuries were built chiefly of this stone and the present Imperial City (New Delhi) is being built mostly of this quality of stone supplied by the State. Varieties of stone quarried from State quarries exhibited.

MINERALS

The State mines yield mica and lead of a superior quality. Experiments in progress. Samples exhibited.

POTTERY & WOOD-WORK

Specimens of plain pottery and wood-work are exhibited.

CATTLE SKIN & BONE

Cattle skin in raw form is largely exported. Cattle bones, duly pounded, are also exported for manure.

Articles Exhibited.

Name of Exhibitors.

Agricultural Products.

| | |
|--|------------------|
| Specimens of Sesamum castor seed, mustard and tobacco leaves, are exhibited | Bharatpur State. |
|--|------------------|

FOREST PRODUCTS—

Nineteen varieties of timber are grown in the State, and specimens of the wood are exhibited in the Stall.

Arts and Industries.

SILK FABRICS—

| | |
|--------------------------------------|-------------------------------------|
| Silk suitings, shirtings and scarves | Radha Krishna Stores, Bharatpur. |
|--------------------------------------|-------------------------------------|

TEXTILES—

| | |
|--|-----------------|
| Specimens of aloes, fibre, wool yarn, Akh cotton yarn, samples of carpets, niwar and cotton cloth. | Bharatpur Jail. |
|--|-----------------|

ART WORKMANSHIP—

Carved hand fans, ivory hand chauris and gold-plated garlands. Two beautifully worked-out pictures in silk, a very exquisite painting of the Fountain Palaces of Dig on a piece of ivory, and two leather suit cases.

POTTERY—

Twenty-four models, ranging from the earthen jug to a table lamp, are on show.

STONE CARVING—

Models of fine screens carved in alabaster, and of stone cups that float in water, with 23 specimens of stones quarried in Bharatpur, are on show.

WOOD WORK—

Specimens of wooden cot stands, cups, bread-making appliances and grinding wheels, are exhibited in the stall.

MISCELLANEOUS—

Twenty-seven pictures, showing specimens of stone and silver carving (for which the State is noted), are on view, together with models of some birds' nests. Models representing housing and occupation in the State are also exhibited.

BIKANER

IS the northernmost State of Rajputana and adjoins the Punjab.

The area of the State is 23,315 square miles, the sixth largest State in area in India, and its population is about 700,000.

The Capital of the State is Bikaner, situated 759 miles almost due north of Bombay, being the fourth largest city of Rajputana. The city, built on a slight elevation, was founded in 1488 and has an imposing appearance, being surrounded by a fine wall four and a-half miles long crowned with battlements and having many lofty and beautifully carved sandstone houses and temples, and a fine fort, which contains old palaces—a massive and impressive pile of buildings, rich in architecture and in interior Indian decorations. The old fort built by Rao Bikaji in 1485, three years before he founded the city, was picturesquely situated on a high rocky ground on the south-west of the city. It is now more of a shrine than a fort.

The reigning family of Bikaner is of the Rathor clan of Rajputs. The State was founded by Rao Bikaji, born in 1439; he was the third son of Rao Jodhaji, Ruler of Marwar (Jodhpur) and left Jodhpur in A.D. 1465 to make a kingdom for himself, finally founding Bikaner City in 1488 A.D. In 1490 Bikaji agreed to the accession of his younger brother Sujaji to the State of Jodhpur, but demanded the family heirlooms in return. On Sujaji's refusal to comply, Bikaji invaded Marwar, captured Jodhpur, and carried off the heirlooms which are still to be seen in the old palace of Bikaner.

The City of Bikaner is well served by electric power, which was first installed in Bikaner as long ago as in 1886, and which also works the water supply, pumped up from wells which are some 300 ft. in depth.

His Highness resides at Lalljorh, which is a masterful and imposing palace in red sandstone. The Gajner Lake and Palaces are situated twenty miles West of Bikaner. Here the Maharajah has his country residence in a garden containing many fine trees. The woods surrounding the lake are a sanctuary for pigs and other wild animals, whilst the Imperial sand grouse shooting here is famous.

The average annual rainfall of the State is about 11½ inches. The north-west portion of the State is a level plain of fine loam, but most of the remaining area consists of rolling sand-hills with intervening depressions; the sandy soil is, however, by nature very fertile, and the nutrient properties of the grasses which grow in abundance in years of good rainfall are very great. There are at present practically no means of irrigation in the State, which in consequence is liable periodically to severe famines, the worst consequences of which have already been mitigated by the establishment of the State railways which measure 568 miles, and it is hoped that the Sutlej Valley irrigation project will entirely alleviate them. Under this project the canal that will irrigate a part of this State, will be taken off from the Sutlej River close to Ferozepore, and after passing over 71 miles of the Punjab lands will enter the State in its northernmost corner. The whole of the main canal to a distance of over 90 miles—the largest undertaking of its kind in the world—will be lined with concrete to prevent waterlogging some adjacent already irrigated land and loss of water by absorption. The work is now well in hand and the main canal has already been dug. The colonization and rectangulation of the area to be irrigated is being carried on, on modern lines under competent supervision. The cost of this scheme to the State will be nearly £1,500,000. It is expected that the income of the State will increase by 65 per cent. directly from the land to be irrigated or if indirect receipts such as increased carriage of goods by railways are included, by 80 per cent. Other important schemes under consideration are the construction of another

730 miles of railway, part of which will run through the irrigated area and other parts of the State and part will form an alternative metre gauge route from Delhi to Karachi through Jaisalmer. These extensions are estimated to cost £3,330,000 and to yield a handsome profit.

Industries have not yet made great progress in the State ; there is, however, a considerable export of raw wool.

With the exception of the Lignite at Palana, 14 miles to the south, and the Red Sandstone at Dulmera, 40 miles to the north of Bikaner, which are being worked at present, the minerals in the State have not so far been exploited to any extent. Limestone is found in abundance in many parts of the State, and the quarries at Dulmera supply excellent red sandstone for all ornamental buildings in and about Bikaner. Copper has been extracted from a mine at Bidasar about 70 miles east of Bikaner, but the mine has not been worked for years. However, it is very probable that investigation in that locality will lead to the discovery of more copper lodes. Extensive beds of gypsum are found at Jamsar close to the railway, about 30 miles north of Bikaner, and in other parts of the State. This material, after being roughly calcined to expel the moisture, has a ready local market and is used largely in plastering inside walls and for internal decorations. With proper treatment and burning in special kilns, it would make a good white plaster equal to plaster of Paris. With the admixture of clay in the right proportion, and burnt in a rotary kiln at very high temperature it would be possible to manufacture sulphuric acid on a commercial scale with gypsum, Portland cement being a secondary production in the process. The lignite or brown coal now mined at Palana is from 160 to 210 ft. in thickness. It possesses the normal characteristics of soft brown coal or lignite found in Germany and in America and has a calorific value of about $\frac{2}{3}$ of good Bengal hard coal. Though in its natural state it cannot be used in locomotive engines, it is, however, universally used in the State in raising steam for all stationary engines and for burning bricks and lime. It is an excellent coal for making suction gas, and if briquetted would be a most valuable addition as a locomotive fuel. The State, in fact, possesses many varied and valuable mineral deposits and offers to private enterprise a tempting and profitable field for investigation and investment.

Food and Agricultural Products.

| | |
|----------------------------------|---------------------------------|
| Wheat | Barley |
| Millet | Grain |
| Sesamum seed | Mustard |
| Oil seeds | Dried pods of cluster beans |
| Dried fruits | Seeds of wild crops and kitchen |
| Samples of sugar and sugar candy | garden plants |

Forest Products.

Specimens of—

| | |
|-------------------------------------|-------------------------|
| Grasses | Plants of textile value |
| Plants of medicinal value | Gums |
| Timbers—(a full list of the timbers | Wool |
| produced in the State will be | Goats' hair |
| available at the stall) | Hides and skins |
| Camel hair | |

Products of Mines, Quarries and Mineral Deposits.

| | |
|---------------------|-----------------|
| Clay | Pottery clay |
| China clay | Clay for cement |
| Fire clay | Fullers earth |
| Bauxite | Saltpetre |
| Limestone | Red oxide |
| Green glass | Quartz sand |
| Calcium hydroxide | Dalomite |
| Gypsum | Salt |
| Red ochre | Yellow ochre |
| Palana Lignite coal | |

Textiles.

WOOLLEN GOODS—

| | |
|---------|---------------|
| Carpets | Rugs |
| Mats | Blankets |
| Shawls | Scarves |
| Felt | Woollen yarns |

COTTON GOODS—

| | |
|----------------------------------|------------------|
| Carpets | Cloth for Shikar |
| Dyed cloths for various purposes | |

FLAX, HEMP AND CORDAGE—

Specimens of the above are on show

LACE, EMBROIDERY AND TRIMMINGS—

| | |
|--|---|
| Cloth of gold | Embroidered ribbons |
| Crinkled edgings | Gold trimmings |
| Silver trimmings | Gold embroidered hairband strips |
| Garlands | Gold embroidered tiara |
| Pearl tassels | Pagri cockades |
| Fancy gold inlaid girdles | Drawn gold Indian dress ornaments |
| Velvet gold embroidered table cloths | Embroidered fans |
| Fancy gold worked evening shoes for ladies | Cotton scarves with silk and woollen embroidery |

SILKS—

| |
|---------|
| Scarves |
| Pagris |
| Dhotes |

Silverware.

| | |
|-----------------------------|---|
| Spirit flasks | Inkpots with penholder |
| Beetle leaf boxes | Scent sprinklers |
| Fittings for bedsteads | Ceremonial lamps and Candelabra |
| Tumblers | Wine glasses |
| Trays | Incense burners |
| Models of birds and animals | Ornamental boxes |
| Vases | Baby's rattles |
| Parts of Hookah | Model of throne used by a former Maharaja |

Ivory Work.

Watch chains
Combs
Scissors
Scent sprinklers
Cigarette holders
Powder boxes
Cups
Puff boxes and a number of other
articles of daily use

Bangles
Paper knives and penholders
Napkin rings
Inkpots
Scent bottles
Walking sticks
Bead necklaces

Fancy Ware.

Old pattern silver scent sprinkler
Fancy flasks
Brass trays
Inlaid zinc vases

Old pattern beetle leaf box
Iron spurs
Ceremonial vases

Wood Work and Lacquer Ware.

Carved wooden hat stands
Wooden cabinets
Carved wooden fire screens

Carved wooden sideboards
Carved wooden whatnots
Carved wooden occasional tables.

Lacquered Indian clubs
Do. walking sticks
Do. brass and marble vases
Miniature replica in lacquered marble of an alcove in a passage in an old palace in the fort
Models of lacquered thrones, camel-hide vases and a set of coloured plates illustrative of the reproductions of lacquer work decorations in some of the old palaces in the fort

Lacquered boxes
Do. plates
Do. bed legs
Do. musical instruments
Do. door panels
Do. table lamps

Pottery and Glass.

Hookahs of white and red clay
Jars, plain and painted

Tobacco pipes

Beadwork.

Cups
Bags
Purses
Miniature bedsteads

Bands
Dress ornaments
Handbags

Flower pots
Fans
Necklaces

Metalware.

BRASS—

Cigar and cigarette boxes
Pen trays
Ash trays
Match boxes
Photograph frames

Pen racks
Ash bowls
Bells hung round camel's neck
Cigarette cases

STEEL—

Clasp knives

Miscellaneous.

Models of the architecture and decorations used in the palaces
Carved marble panel
Model of cenotaph
Carved Pink Sandstone panels

Descriptive models of Bikaner pony carriage, bullock cart, elephant with howdah and trappings, horse with trappings, camel with trappings, agricultural scene, are being exhibited

All the exhibits are being shown by the State.

CUTCH

THE State is bounded on the north and north-west by Sind, on the east by the Palanpur Agency, on the south by the Peninsula of Kathiawar and the Gulf of Cutch and the south-west by the Indian Ocean. Its area, exclusive of the great salt marsh called the Rann of Cutch, is 7,616 square miles. The capital is Bhuj. There is a fair proportion of good arable soil in Cutch, and wheat, barley and cotton are cultivated. Both iron and coal are found but are not worked. Cutch is noted for its beautiful embroidery and silverwork and its manufactures of silk and cotton are of some importance. Trade is chiefly carried on by sea.

Articles exhibited.

Exhibitor.

Agricultural Products.

Specimens of cotton, cotton pods and cotton seeds Sheth Ebji Shioji.

Textiles.

Hand woven cloth (33 specimens) Sidhik Haje.

Silk fabrics, consisting of dyed and fancy
kerchieves, sarees, scarves, etc. (22 varieties)

Silk and cotton fabrics (19 varieties)

Specimens of knot dyeing and printing in cotton

Carpets

Embroidered Indian skirts

Do. Curtains

Do. Cushion covers

Do. Rosary bags

Do. Table cloths

Do. Tapestry

Details of dealers can
be obtained at the
stall.

Art and Artwork.

Specimens of silver work, consisting of—

Bowls Faradi Umarsey Mavji.

Cigar and cigarette boxes Sutar Mavji, Raghavji

Candle stands and Co.

Card cases Soni Meghji Keshavji.

Flower vases Soni Devsey Harji.

Fruit stands Jetholal Bros.

Handles to walking sticks Devji Kalyarji.

Milk jugs Guffar Muranji Mulji.

Photograph frames Shiram Chamanrai.

Salt cellars

Sugar basins

Soap boxes

Teapots

Tea trays

Umbrella handles

Water pots

Samples of enamelled work in gold and silver
are exhibited.

Stones and Stoneware.

Samples of pavement slabs and paperweights.

Pottery.

| | | | | | | |
|-------------|----|----|----|----|----|---------------------|
| Teapots.. | .. | .. | .. | .. | .. | Mistri Osman Jacob. |
| Sugar pots | | | | | | |
| Milk jugs | | | | | | |
| Jars | | | | | | |
| Flower pots | | | | | | |

Miscellaneous.

Models of Kutch boats, articles in copper and brass are also exhibited.

Holkar State, Indore

HOLKAR STATE is one of the premier Indian States. It occupies an area of 9,500 square miles, principally in the region known as Central India. Its population is 1,151,573. The State is ruled over by the Holkar Dynasty which is well known in Indian history.

The capital of the State is Indore, which has a population of over 100,000. It is situated about 2,000 ft. above sea level on what is called the Malwa Plateau and enjoys a beautiful temperate climate practically throughout the year, with the exception of the months of May and June, which are rather hot. It is a picturesque town with trees and numerous fine and artistic buildings. The town of Indore has an area recently set apart for industries and which is known as the industrial town or area of Indore.

The principal commercial crops of the State are Malwi wheat (one of the best qualities grown in India), cotton and oil-seeds. Besides these several other food grains as maize, juwar, pulses, etc., are grown principally for local consumption or export to adjoining foreign territories.

There are several cottage industries which abound in different parts of the State, e.g., to name some of the principal ones, the well-known Maheshwar hand-loom weaving industry that turns out "Sarees" (women's wear) of excellent quality, the cutlery, swords and silver and gold engraved articles produced in Rampura (the Northern district of the State), the blankets produced in Manasa, the hosiery works in Indore, the calico-printing in Gautampura (Indore district), the wood-carving, cane and bamboo-making are done in several parts of the State.

Apart from these and other handicrafts and arts, other industries on the factory system have been more or less successfully experimented with during the last few years. To mention the more important ones, a *Thymol* factory has been started to manufacture Thymol from ajwan seed produced locally; a *Glass Factory* has been established to manufacture glass wares of several descriptions from the raw materials easily accessible in the State, a *Brush Factory* to manufacture brushes of several varieties was started, but for want of working capital to tide over an unforeseen contingency, it has been closed down but it is hoped that the present management will be reorganised and the industry re-started soon. *Tile and Brick Factories* are doing good work, *Iron and Brass Foundries* are successfully carrying on their work.

Towering above all these industries, arts and handicrafts of the State, stand out pre-eminently, however, the cotton industry of the State, which is by far the most important and predominant industry of the State. Next to Bombay and Ahmedabad, Indore might well claim the position of having a number of large cotton spinning weaving mills greater than in any other town in India. Six large cotton and spinning mills are already working, while the erection of three more large ones is nearing completion, and they will be working very shortly.

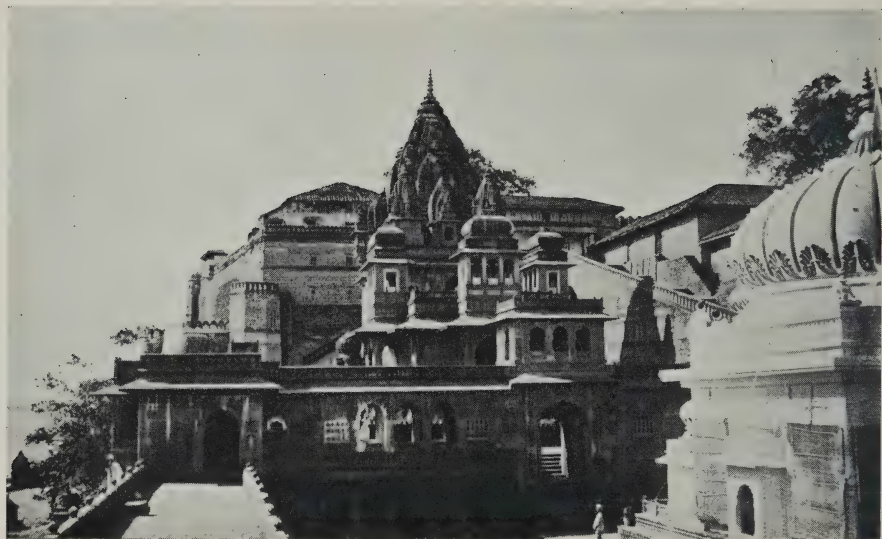
The Holkar State is not exhibiting in the ordinary way, but is having a small Court as a sort of reception room, in which the industry and commerce dept. of the State has arranged to have an Information Bureau with the object of propagating information regarding the industrial and commercial activities of the state and to interest British financiers and enterprisers in some of the protected industrial schemes which His Highness' Government have in view, and will exhibit by way of sample only the following agricultural and mineral products of the State :—



Bada Sarafa—The big business centre



Krishnapura Bridge.



Maheswar Chattri.



At the Mills.

(Note the large number of bullock carts, which are the common conveyances for goods.)

Agricultural Products of Commercial Importance.

FOOD GRAINS.

| | |
|-------------|--------------|
| Wheat Malwi | Tuwar Dal |
| Wheat Pissi | Urad Dal |
| Gram | Juwar |
| Bajra | Mung (green) |
| | Mung (black) |

OILSEEDS.

| | |
|----------------|---------|
| Ajwan | Sesamum |
| Alsi (linseed) | |

COTTON.

| | |
|-----------------------|----------------------|
| Cotton Malwi (Kannod) | Cotton Rosem (Nima) |
| Brown cotton (Kannod) | |

Minerals hitherto known to exist in the State—

Articles Exhibited.

| | |
|----------------------------------|-----------------------|
| Red oxide of iron (very rich) | Basalt (usual black) |
| Iron ore | Slate stone |
| Manganese ore | Crystalline limestone |
| Sandstone | Basalt |
| Quartzite | Sandstone quartzite |
| Conglomerate | Head Quartzite |
| Basalt (green) | Granite |
| Schist | Gneissose granite |

JAIPUR

JAIPUR, the wealthiest and most populous of the Indian States in Rajputana, covers an area of 15,579 square miles. The population at the 1921 census was 2,338,802. The number of towns and villages in the State is 5,803.

The Jaipur country is for the most part open and level, though its surface is crossed and diversified by groups and ranges of hills and numerous isolated peaks. These latter are often crowned by the castles of the Thakurs (nobles), giving the country a picturesque and romantic appearance. The central portion of the State, where lies the City of Jaipur, consists of an elevated tableland from 1,400 to 1,600 feet above the sea.

Amber remained the capital of the State for some centuries. Jaipur, the modern capital, was founded in 1728 A.D. by Maharaja Sawai Jaisinghji II, after whom it is named. The city is regularly laid out in rectangular blocks, the main streets being 111 feet wide. There are various stories to account for the regular plan of the city. One is that the Observatory was the first thing made, and that the Maharaja, following his mathematical bent, had the city laid out with mathematical precision. Another account is that there was a shooting box and garden where the alligator tank now is, and that the regular plan of the garden was copied in laying out the town. A further story has it that Constantinople was taken as a model, and yet another that the Chandni Chouk, at Delhi, gave the Maharaja the idea. But, however this may be, the result has been to produce what must be one of the most striking and remarkable cities in Asia. A notable feature is that the whole city is one of uniform colour, viz., pink.

The principal institutions and buildings are (1) the Maharaja's Palace, embracing the Observatory, the Stables, the Armoury, the Private Library and the Alligator Tank; (2) the Hawa Mahal; (3) the Maharaja's College; (4) the School of Arts; (5) the Public Library; (6) The Mayo Hospital; (7) the Ramniwas Gardens; (8) the Albert Hall and Museum; (9) the Jails; and (10) the Rambagh Palace.

Among the important environs of Jaipur the following may be mentioned: Amber, the old capital; Sanganer, which is famous for its chintzes; Galta; the Old Ghat; the New Ghat Gardens; and the Cenotaphs of Maharajas.

Jaipur is noted for the skill of its artisans and the beautiful work they turn out. The principal art manufactures are:—

1. Water colour painting.
2. Stone carving.
3. Brass work (plain, engraved, embossed, perforated and enamelled).
4. Damascening on metal.
5. Enamelling on gold and silver.
6. Gold and silver jewellery.
7. Garnet and crystal jewellery.
8. Arms.
9. Pottery.
10. Lacquer work.
11. Papier machie models.
12. Dyed and stamped cotton cloth (Sanganer and Bagroo chintzes).
13. Jaipur coloured cloth (Laharia, Mothra and Choondri).
14. Carpets.
15. Cotton floor cloths (durries).
16. Malpura felts.
17. Sandal wood toys.
18. Ivory toys.
19. Lace.
20. Wood carving.

Specimens of Jaipur work are exhibited. All the exhibits in the Jaipur Court are hand made, except the coloured cloth of Laharia, Mothra and Choondri, and most of the cloth of Sanganer and Bagroo chintzes, in which the speciality is not the cloth, but the dyeing and printing, which is done without the aid of machinery.

Arts and Industries.

and Industries.

Articles Exhibited.

Name and Address of Exhibitors.

IVORY.

Models of the following in different varieties are on show :—

| | |
|-----------------------------------|---------------------------------|
| Bead necklaces (plain and carved) | Camel |
| Cow | Elephant |
| Bullock cart | Lion |
| Vases | Boxes |
| Pendants | Cups |
| Paper cutters | Hair pins |
| Flower pots | Bracelets |
| Birds | Rose water sprinklers |
| Motor cars | Snake charmers |
| | Sticks and other fancy articles |

| |
|--|
| Mr. Harnath, near Railway Station, Jaipur, Rajputana. |
| Messrs. P. M. Alabuksh & Co., Ajmere Gate, Jaipur, Rajputana. |
| Mr. Sheo Sahai, Kalyanji-Ka-Rasta, Jaipur, Rajputana. |
| Mr. Mahadea Kharadi, Chandpole Gate, Jaipur, Rajputana. |
| Messrs. Govindram & Oodey Ram, Ajmeer Gate, Jaipur, Rajputana. |

GOLD.

Enamelled articles of the following description are exhibited :—

| | |
|-----------|---------------|
| Peacock | Bead necklace |
| Rings | Brooches |
| Bangles | Trays |
| Bracelets | |

| |
|---|
| Messrs. S. Zoraster & Co., Johri Bazar, School of Art, Jaipur, Rajputana. |
|---|

SILVER.

Embossed, enamelled or perforated articles of the undermentioned description are on show :—

| | |
|---|--------------------------------------|
| Tea pots | Sugar bowls |
| Milk jugs | Finger bowls |
| Boxes with inkstands | Enamelled brushes |
| Inkstands | Panels |
| Photograph frames | Belt buckles |
| Walking stick handles | Cigarette cases (partly gold-plated) |
| Cases for keeping betel leaves (partly gold-plated) | Incense burners |
| | Album locket |
| Brush | |

| |
|--|
| School of Art, Jaipur, Rajputana. |
| Mr. Lachmin Narayan, School of Art, Jaipur, Rajputana. |
| Messrs. Noor Bux, & Khuda Bux & Co., Ajmere Gate, Jaipur, Rajputana. |
| Messrs. Govindram & Oodey Ram, Ajmere Gate, Jaipur, Rajputana. |
| Messrs. P. M. Allaha, Bux & Co., Ajmere Gate, Jaipur, Rajputana. |

Arts and Industries—*contd.*

| Articles Exhibited. | Name and Address of Exhibitor. |
|--|---|
| MARBLE. | |
| Models of Carving are on show :— | |
| Figure : Woman (Pahari), coloured..... | Mr. Harnath, near Railway Station, Jaipur, Rajputana. |
| Figure : The Hindu Trinity (copied from the Sculpture and Elephanta Caves) | Mr. Gulab Chand, Sculptor, School of Art, Jaipur, Rajputana. |
| Panel in low relief : Bust of a female musician (a detail from an old Rajput painting) | Mr. Mali Ram, Sculptor, Chandpole Bazar, Jaipur, Rajputana. |
| Marble camel (seated) | Mr. Mali Ram, Sculptor, Chandpole Bazar, Jaipur, Rajputana. |
| (1) WOOD (carved). | |
| Tray stands | Scent stand (Chopra) |
| Ekka | Mantelpiece |
| Bracket (with glass panels) | Tile table |
| Box | And model of ram may be seen in this section |
| School of Art, Jaipur, Rajputana. | Mr. Ganesh Carpenter, School of Art, Jaipur, Rajputana. |
| (2) WOOD (lacquer). | |
| Jugs | Mr. Mahadev Kharadi, Chandpole Gate, Jaipur, Rajputana. |
| Water vessels (with and without covers) | |
| Boxes in different shapes and styles | |
| Flasks | |
| Trays | |
| Indian chair (Peedha) with cushion, and electric table lamp are exhibited. | |
| PAPIER MACHÉ. | |
| Models of— | |
| Lion | Tiger |
| Seated bull | Rhinoceros |
| Standing cow | Flamingo |
| Duck | Partridge |
| Snake | Leopard |
| A musician | Clerk |
| Woman carrying water (Panihari) | Snake charmer |
| Hen with four | chickens |
| And some other animals and birds, constitute this section. | |
| School of Art, Jaipur, Rajputana. | Mr. Ram Kumar, Papier Machie Toy Maker, Chandpole Bazar, Jaipur, Rajputana. |
| JEWELLERY. | |
| Seven kinds of necklaces are exhibited. | |
| School of Art, Jaipur, Rajputana. | Messrs. P. M. Allaha Bux & Co., Ajmere Gate, Jaipur, Rajputana. |
| Messrs. Nur Bux, Khuda Bux & Co., Ajmere Gate, Jaipur, Rajputana. | |

Arts and Industries—*contd.*

Articles Exhibited.

DAMASCENE ON IRON.

Specimens of silver and gold work in trays, shields, helmets, salvers, belt buckles, cigarette box, battle axes, daggers, tabars, knife box, water-vessel, match box, sword hilts, ash tray, and card case are exhibited

Name and Address of Exhibitor.

School of Art, Jaipur, Rajputana.

Messrs. P. M. Allaha Bux & Co., Ajmere Gate, Jaipur, Rajputana.

Messrs. Noor Bux Khuda Bux & Co., Ajmere Gate, Jaipur, Rajputana.

Mr. Wazir Khan, School of Art, Jaipur, Rajputana.

STEEL.

A goad, a sword and an engraved peacock, are the exhibits.

School of Art, Jaipur, Rajputana.

Messrs. Noor Bux Khuda Bux & Co., Ajmere Gate, Jaipur, Rajputana.

BRASS (embossed, engraved, enamelled and perforated and plain).

| | |
|----------------------|-----------------|
| Bowls | Vases |
| Jugs | Water vessels |
| Palm pots | Salvers |
| Shields | Candlesticks |
| Coffee pots | Betel boxes |
| Cigarette boxes | Inkstands |
| Rosewater sprinklers | Tea kettles |
| Trays | Hubble-bubbles |
| Powder boxes | Wine cups |
| Napkin rings | Flasks |
| Incense burners | Paper cutters |
| Screens | Tripod stands |
| Models of animals | Lamp stands |
| | Indian chariots |

School of Art, Jaipur, Rajputana.

Messrs. P. M. Allaha Bux & Co., Ajmere Gate, Jaipur, Rajputana.

Messrs. S. Zoraster & Co., Johri Bazar, Jaipur, Rajputana.

Mr. Bal Mistry, Dariba Pan Street, Jaipur, Rajputana.

Messrs. Noor Bux Khuda Bux & Co., Ajmere Gate, Jaipur, Rajputana.

Messrs. Haji Dula Bros., near School of Art, Jaipur, Rajputana.

Mr. Chothmal Haluka, Ajmeri Bazar, Jaipur Rajputana.

Messrs. Sunderlal & Sons, Tripoliya Bazar, Jaipur, Rajputana.

Messrs. Govind Ram & Oodey Ram, Ajmere Gate, Jaipur, Rajputana.

Toys, cigar boxes, card cases, perforated Indian stool (Chowki), and hanging, rolling, palace, standard and table lamps of various patterns, and several other miscellaneous things, are on show.

Enamelled chess set, peabocks and trays (oblong, octagen and round) of all sizes and designs, especially the shawl and peacock patterns, for several purposes.

Arts and Industries—*contd.*

| Articles Exhibited. | Name and Address of Exhibitor. |
|---|-----------------------------------|
| POTTERY. | |
| Models of— | School of Art, Jaipur, |
| Flasks | Rajputana. |
| Tiles | Mr. Jamna Pershad, |
| And other miscellaneous things, are exhibited | School of Art, Jaipur, Rajputana. |

WATER COLOUR PAINTINGS.

| | |
|--|---|
| Several historical water - colour paintings of Khewat Sambad, Draupadi Swayambar, Margapali procession, Prithiraj Sanjogita, Bhimbhikan Milap, Maharaja Man Singh I, of Amber (Jaipur), Dayalji, the late Maharaja Sawai Madho Singhji of Jaipur (on ivory with frame), Setband Rameshwar and King Jahangir (tiger licking emperor's feet), are on view. | Mr. Ganga Bux, Painter, Pothikhana, Jaipur, Rajputana. |
| | Mr. Ganeshlal, Maharaja's College, Jaipur, Rajputana. |
| | Mr. Gopiram, Painter, Mohalla Halukan, Jaipur, Rajputana. |

SHOES.

INDIAN SHOES (EMBROIDERED).

| | |
|--|---|
| Indian velvet shoes, slippers (silk and gold embroidered), for ladies, gents and children, of various sizes and patterns, are exhibited. | Mr. Noormohammad, Shoemaker, near Hawa Mahal, Jaipur, Rajputana. |
| | Mr. Alibux Marwari, Shoemaker, near Shyamji's Temple, Ramgunj Bazar, Jaipur, Rajputana. |
| | Sikar Estate, Jaipur, Rajputana. |

Textiles.

RUGS.

| | |
|---|--|
| Woollen rugs and carpets, of Jaipur, Shikar, Kashmere and Persian patterns. | Jaipur Central Jail, Rajputana. |
| | Messrs. S. Zoraster & Co., Johri Bazar, Jaipur, Rajputana. |
| | Messrs. P. M. Allaha, Bux & Co., Ajmere Gate, Jaipur, Rajputana. |

COTTON AND SILK FABRICS.

| | | |
|---|--------------|---------------------------|
| Sanganese and Bagroot chintzes | | Messrs. Kanhayalal |
| Chintzes (of different qualities and varieties) | | Bajjnath, Johri |
| Turban cloths, tied and dyed (Bandhana) | | Bazar, Jaipur, Rajputana. |
| Scarves | do. do. | |
| Sarees | do. do. | Messrs. Maliram Faqir- |
| Silk sarees and scarves | do. | chand, Johri Bazar, |
| Silk kerchiefs | do. | Jaipur, Rajputana. |

Arts and Industries—*contd.*

| Articles Exhibited. | Name and Address of Exhibitor. |
|--|--|
| Of different qualities, size, colour, patterns and varieties, are on show. | Messrs. Sitaram Lachminarain (through Mr. Ghasilal), Manak Chowk, Jaipur, Rajputana. |
| | Messrs. R. D. Labhchand & Co., Tripoliya Bazar, Jaipur, Rajputana. |
| | Messrs. Johrilal Ramnarayan, Tripoliya Bazar, Jaipur, Rajputana. |
| | Sikar Estate, Jaipur Rajputana. |

MISCELLANEOUS.

Miscellaneous things, including the following, are also exhibited :—

| | |
|---|-----------------------|
| Glass phials with letters written from inside | Mr. Jiwan Singhji, of |
| Glass phial with a bed spun inside | Narwar, Jaipur, |
| Post card, having 119 lines, or 7,055 wards | Rajputana. |
| " Snion " written in vernacular | Mr. Madholal, Chowd- |
| Set of current Jaipur State stamps | hari, Ajmere Gate, |
| Set of current Jaipur State coins | Jaipur, Rajputana. |
| Felts | Mr. Jamnaprasad |
| Gold and silver lace samples | Clerk, Army Office, |
| | Jaipur, Rajputana. |
| | Mr. B. D. Bhargava, |
| | B.A., Philatelist, |
| | Jaipur, Rajputana. |
| | Messrs. R. D. Lakh- |
| | chand & Co., |
| | Tripoliya Bazar, |
| | Jaipur, Rajputana. |

List of Jaipur State Court Exhibitors.

Alibukhsh Marwari, Shoemaker, near Shyamji's Temple, Ramgunj Bazar, Jaipur, Rajputana.
 Bal Mistry, Dariba Pan Street, Jaipur, Rajputana.
 B. D. Bhargava, B.A., Philatelist, Jaipur, Rajputana.
 Central Jail, Jaipur, Rajputana.
 Chothmal Haluka, Ajmeri Bazar, Jaipur, Rajputana.
 Gobindram & Oodeyram, Ajmeri Gate, Jaipur, Rajputana.
 Gulabchand, Sculptor, School of Art, Jaipur, Rajputana.
 Ganesh, Carpenter, School of Art, Jaipur, Rajputana.
 Gangabukhsh, Painter, Pothi Khana, Jaipur, Rajputana.
 Ganeshlal, Maharaja's College, Jaipur, Rajputana.
 Gopiram, Painter, Mohalla Halukan, Jaipur, Rajputana.
 Haji Doola Brothers, near School of Art, Jaipur Rajputana.

Harnath, near Railway Station, Jaipur, Rajputana.
 Jawan Singhji, of Narwar, Jaipur, Rajputana.
 Jamna Prasad, Clerk, Army Office, Jaipur, Rajputana.
 Jamnaprasad, School of Art, Jaipur, Rajputana.
 Johrilal Ramnarain, Tripoliya Bazar, Jaipur, Rajputana.
 Kanhyaalal Baijnath, Johiri Bazar, Jaipur, Rajputana.
 Lachminarain, School of Art, Jaipur, Rajputana.
 Madho Lal Chowdhari, Ajmeri Gate, Jaipur, Rajputana.
 Mahadeva Kharade, Chandpole Gate, Jaipur, Rajputana.
 Maliram, Sculptor, Chandpole Bazar, Jaipur, Rajputana.
 Maliram Faqirchand, Johri Bazar, Jaipur, Rajputana.
 Nurbukhsh Khudabukhsh & Co., Ajmeri Gate, Jaipur, Rajputana.
 Nur Mohammad, Shoemaker, near Hawa Mahal, Jaipur, Rajputana.
 P. M. Alabukhsh & Co., Ajmeri Gate, Jaipur, Rajputana.
 Ram Kumar, Papier Machie Toy Maker, Chandpole Bazar, Jaipur, Rajputana.
 R. D. Labhchand & Co., Tripoliya Bazar, Jaipur, Rajputana.
 School of Art, Jaipur, Rajputana.
 Sheosahai, Kalyanji Ka Rasta, Jaipur, Rajputana.
 Sikar Estate, Jaipur, Rajputana.
 Siltharam Lachminarayan (through Mr. Ghasilal), Manak Chowk, Jaipur, Rajputana.
 Sunderlal & Sons, Tripoliya Bazar, Jaipur, Rajputana.
 S. Zoraster & Co., Johri Bazar, Jaipur, Rajputana.
 Wazir Khan, School of Art, Jaipur, Rajputana.

P. M. ALLAHA BUX & CO.

Manufacturers, Dealers & Exporters

of all kinds of Jaipur and Indian made Art
 Manufactures and Curios, including Ivory,
 Silver, Damascene and Brasswares (of all des-
 criptions), Carpets, Jewellery, Pictures, old
 and new Arms.

*Holders of many awards (Medals and
 Certificates) at several Exhibitions.*

(Outside Ajmere Gate, Jaipur City
 Rajputana, India.)

HAJI DOOLA

 **BROTHERS** 

(Near School of Arts, Jaipur, Rajputana, India.)

Manufacturers and Dealers
in the famous hand-made

Jaipur Brasswares

Specially enamelled (Fine
Maimari Bidar pattern)
:: articles of all kinds. ::

NOOR BUX KHUDA BUX & CO.

(Ajmere Gate, Jaipur, Rajputana, India.)

Merchants and Dealers in hand-made
Damascene. Brass Articles embossed,
engraved and enamelled. Old Paint-
ings and Manuscript Books. Arms,
antique and modern. Ivory and
Precious Stone Necklaces, Gold and
Silver Embroidery.

Awarded Medals and Certificates at various Exhibitions.

JODHPUR

THE Jodhpur State is the largest independent State in the area known as Rajputana, and has an area of some 35,000 square miles. It is also known as Marwar, which literally means "region of death," a description, however, which equally applies to the neighbouring States of Bikaner and Jaisalmer, the name Marwar covering, in ancient writers, the whole of the semi-desert area occupied by these three States. It is bounded on the north by the province of the Punjab, on the south by the area known as Gujrat, on the east by the outer range of the Vindhya Hills, known as the Aravallis, and on the west by the British Province of Sindh, which partakes of its characteristics. The Luni River, a dry drainage channel with a sandy bed, runs diagonally across it, dividing it into two unequal portions. The area east and south of this stream, which is traversed by a number of similar drainage channels having their origin in the Aravallis, is of considerable greater fatality than the area to the north and west, which forms part of or comprises the outskirts of the Indian Desert, known as the "Thal." Except in the vicinity of the Aravallis and along the various drainage channels, the water supply is scarce, and as the rainfall is extremely capricious and irregular, the country is sparsely inhabited and of no great agricultural importance. Until the construction of the Jodhpur-Bikaner Metre Gauge Railway, with its various branches, in the last decade of the last century, the tract was much isolated, and, as might be expected, the population extremely backward and dependent practically on their own efforts for most of the necessities of life. Much of its wealth has always consisted of animal products derived from the vast herds of cattle, sheep and goats, which obtain an easy subsistence, ranging over the vast expanses of scrub jungle in which the country abounds. In the past it has been famous for a hardy breed of horses, and though the industry of horse-breeding has now to some extent fallen into abeyance, the output is still considerable. Marwar has always been one of the best-known breeding grounds for camels, and two local breeds of oxen known as the Nagore and Sanchor, after the places where they are chiefly bred, are still famous throughout North-Western India. While there is nothing peculiar about the sheep, the local breed of long-haired goats is of importance, and the country supplies several of the larger towns in the West of India with these animals for butcher's meat. Two cattle fairs of importance are held in it, one in the west at Tilwara, in March-April, and the other in the east at Parbatsar, not far from Ajmer, in October.

Being thus largely a pastoral country, the Jodhpur State exports large quantities of animal products in the shape of wool, goat's hair, Ghee (clarified butter), bones and hides. In connection with the last, mention may be made of the fact that an excellent tanning material, derived from the bark of the Anwal shrub (*cassia anoriculata*), which grows wild all over the tract south and east of the Luni, can be had in abundance, and a growing industry is the tanning of sheep skins and goat skins, which are now exported in increasing quantities to Bombay. The bulk of the wool and goat's hair finds its way to Cawnpore, where it is utilised by the local mills, or to Bombay, whence it is also exported.

As a result no doubt of its isolation in the past, the manufacture of shoes, bags, belts, slippers, saddles and other articles made from leather was considerable, and though the use of these are now being rapidly displaced by imported articles, they still find a considerable local sale or are exported as curiosities. Similarly, cloth and blankets woven from the wool locally produced have always been manufactured in considerable quantities. This article is also still used in the manufacture of mats, carpets and bags.

The mineral products of the country, though not with one exception of

much importance, are with the growth of communications beginning to find more than a local market. The one exception is marble, which is quarried from the hilly outcrops near Mokrana, a station on the Jodhpur-Bikaner Railway, in the north-east of Marwar. The marble, which is white, though of a somewhat coarse-grained structure, is famous throughout Northern India, and has furnished the material out of which some of the finest buildings in India have been made. Reference need only be made to the Taj Mahal at Agra, the Pearl Mosque at Delhi, and, in recent years, the Victoria Memorial at Calcutta. Sand stone of excellent quality, and capable of being fractured into slabs as long as 12 ft., as well as squares as small as 6 ins., is found in several places, the best quarries being in the neighbourhood of Jodhpur. This sand stone, which also can be easily carved, is at the present moment being exported in considerable quantities for use in buildings at Karachi. A mine producing the somewhat rare mineral wolfram was discovered early in the Great War, and was worked steadily to the conclusion of hostilities. Other mineral products found in large quantities are limestone, Fuller's earth and gypsum. Lastly, from the Samphar Lake comes a large proportion of the salt which supplies the needs of Northern India, the supply being eked out from two other places at Pachpadra and Deedwana. No precious metals or minerals have yet been discovered in the State, but there are supplies of fine-grained granites, ochres and clays.

The artistic products, though not carried on on an extensive scale, are numerous and valuable. Intricate dyeing has always been a speciality of Jodhpur, and large quantities of scarves (chundries) dyed in various delicate shades, as well as "tie dyed" (that is to say, in which spots of various shapes are made by being independently tied up and independently dyed), find a ready sale throughout Rajputana and among visitors as turban cloths and as motor-veils. Simple dyeing and block printing is also carried on. Ornaments in the shape of seed, bead and pearl necklaces, braids interspersed with ornaments of finely beaten gold, ivory bangles ingeniously cut from the tusk, toys of various descriptions and other fancy articles of various materials, including gold and silver, are made in considerable quantities. At Merta there are still some craftsmen skilled in the work of ivory turning who produce chains and necklaces with links ingeniously cut from the solid ivory, boxes, pen holders, and other articles. At Bogri, and to a less extent in Jodhpur itself, beautifully lacquered candlestocks, boxes, toys, frames, etc., are made, the lacquer being of two colours—red and gold. A considerable industry in the making of brass vessels from imported sheet brass is also carried on, while swords, daggers and articles of cutlery of some merit are still made. In ancient times the casting of cannon was carried on, and the inlaying of gun barrels and sword hilts with gold or brass filigree work became a fine art. It has now, however, almost completely died out. But the State is a veritable mine in this respect for the curio hunter.

In short, Marwar, since the introduction of the railway, has become a tract of commercial importance for cattle, ghee, sheep and goats for slaughter, bones, hides, marble and certain other minerals. Its manufactures are necessarily few and unimportant, its industries being mainly cottage industries, and the output rather of an artistic and a commercial nature.

| Articles Exhibited. | Exhibitor |
|---|------------------------|
| Textiles. | |
| Bedspreads (cotton and silk and wool) | Jodhpur State Industry |
| Door covers | Dept. |
| Curtains | Do. do. |
| Peasant women's dresses from the Rajputana | |
| Desert | Do. do. |

Textiles—*contd.*

| Articles Exhibited. | | | | | | Exhibitor. | |
|---|----|----|----|----|----|------------------------|-----|
| Hat scarves | .. | .. | .. | .. | .. | Jodhpur State Industry | |
| Handkerchiefs | .. | .. | .. | .. | .. | Dept. | |
| Mufflers | .. | .. | .. | .. | .. | Do. | do. |
| Mosquito screen | .. | .. | .. | .. | .. | Do. | do. |
| Turban cloths (simple, embroidered and printed) | .. | .. | .. | .. | .. | Do. | do. |
| Tray covers | .. | .. | .. | .. | .. | Do. | do. |
| Velvet caps | .. | .. | .. | .. | .. | Do. | do. |
| Table cloths | .. | .. | .. | .. | .. | Do. | do. |
| In several colours and designs. | | | | | | | |

Leather and Leather Goods.

| | | | | | | | |
|--|----|----|----|----|----|------------------------|-----|
| Corn measures (in camel hide) | .. | .. | .. | .. | .. | Jodhpur State Industry | |
| Ammunition belt (old Indian fashion) | .. | .. | .. | .. | .. | Dept. | |
| Cured skins of small animals | .. | .. | .. | .. | .. | Do. | do. |
| Specimens of tanned hides | .. | .. | .. | .. | .. | Do. | do. |
| Lamp shades | .. | .. | .. | .. | .. | Do. | do. |
| Money bags | .. | .. | .. | .. | .. | Do. | do. |
| Slippers | .. | .. | .. | .. | .. | Do. | do. |

Art and Artware.**IVORY—**

| | | |
|------------------|----------------|------------------------|
| Bangles | Necklaces | Jodhpur State Industry |
| Buttons | Paper cutters | Dept. |
| Cigarette pipes | Rings | Do. |
| Collyrium cases | Scent phials | Do. |
| Combs | Soap boxes | Do. |
| Condiment sprays | Tumblers | Do. |
| Knives | Walking sticks | Do. |

LACQUERWARE—

| | | |
|------------------------|---------------------|------------------------|
| Chessmen | Drawer handle knobs | Jodhpur State Industry |
| Cups | Jars | Dept. |
| Collar and jewel boxes | Lamp stands | Do. |
| Cot legs | Penholders | Do. |

STONE WORK—

| | |
|-------------------|--------------------|
| Blotting pads | Flower stands |
| Ornamental dishes | Models of animals |
| Paper weights | Images and statues |
| Tea cups | |

GLASS BEAD WORK—

| | |
|-----------------------|------------|
| Hair bands | Pendants |
| Shoulder hang strings | Garlands |
| Bridal headwear | Fans |
| Hair coil pendants | Jars |
| Bracelets | Money bags |
| Wristlets | Penholders |

METAL WARE—

Carved knives and daggers richly decorated.
Tourists' water carriers.

Perfumery.

Perfumes used in the cold season.
Perfumes used in the rainy season.
Perfumes used in the hot season.
Perfumes used in the autumn.

KASHMIR

"Who has not heard of the Vale of Cashmere
With its roses, the brightest that earth ever gave,
Its temples and grottos, and fountains as clear
As the love-lighted eyes that hang over their wave?"

THE Valley of Kashmir is perched securely among the Himalayas, at an average height of 5,600 feet above the sea. It is approximately eighty-four miles in length and twenty to twenty-five miles in breadth. On the south the Valley is cut off from the Punjab by rocky barriers, while on all other sides it is guarded by ranges of mountains. Until the end of May, and sometimes lasting to the beginning of October, there is a continuous ring of snows around the Valley. It has been stated that it is impossible to compare Kashmir with other well-known countries on account of its high elevation, dry climate, and curious flora in which East blends with West. The climate of the Valley has been likened to that of Switzerland until the end of May, and to that of Southern France in July and August, but, as Mr. (now Sir) Walter Lawrence has said, it is impossible to speak of Kashmir as possessing any one climate or group of characteristics; every hundred feet of elevation brings some new phase of climate and of vegetation.

The Valley has been called the "Paradise of the Indies." It is generally known as the "Happy Valley." There is "sport varied and excellent, there is scenery for the artist and layman, mountains for the mountaineer, flowers for the botanist, a vast field for the geologist, and magnificent ruins for the archaeologist. The epicure will find dainty fruits and vegetables cheaper here than in any part of the world; while the lounge can pass delightful days . . . in a . . . house-boat moored under the shady Chinar tree; and last, but not least, the invalid must find somewhere in the varied climate of Kashmir the change of air and water which will restore him to the health of which the heat of the Indian plains has robbed him." Every year's residence in the Valley, it has been said, discloses some new charm and new interest.

The Dal Lake, measuring four by two-and-a-half miles, lies close to Srinagar, and is said to rank as one of the most beautiful spots in the world. "The mountain ridges, which are reflected in its waters as in a mirror, are grand and varied, the trees and vegetation of the shores of the lake being of exquisite beauty. It is difficult to say when the Dal is most beautiful. In Spring the fresh green tints of the trees and mountain sides are refreshing to the eye, but it is perhaps in October that the colours of the lake are most charming. Nature has done much for the Dal, but the Moghul Emperors have, in their time, nobly exerted themselves to enhance the natural beauties of the lake." The gardens of Nishat and Shalimar have added a distinctive charm to the lovely lake. "The park of plane trees known as the Nasim Bagh ('the garden of breeze'), which was planted in Akbar's time, is the most beautiful of all the pleasure places of the royal gardeners of old times; but, wherever one looks, the Dal Lake has some new view of beauty."

The city of Srinagar, the capital of the Valley, is thirty-four miles above Baramulla, a town of importance at the southern end of the Valley. The city is built on both banks of the river Jhelum, which passes placidly through it and looks very pretty and picturesque. From Khanabal, thirty-three miles above Srinagar, to Baramulla, thirty-four miles below it, the river runs calm and placid, and most of the traffic passes up and down in boats of various sizes as required for different purposes. House-boats are now very common on the river, and one sees the banks studded with them throughout the city and its suburbs. These afford quite comfortable accommodation to the visitor, and he can take the boat up or down as he pleases, or move it to a shady place according to his own pleasure and liking.

POPULATION

The Valley is divided into two districts, the Southern and the Northern. The Southern Division has a population of 688,487 souls, and it includes Srinagar city, with a population of 141,735. The Northern Division has a total population of 502,490. The whole Valley has thus a population of 1,200,000.

SEASONS

Springtime in Kashmir begins about the middle of March, when all the fruit trees in gardens in and round Srinagar are in blossom. July and August are the hottest months, when the temperature sometimes rises to 97 degrees (Fahrenheit). October and November are perhaps the most pleasant and healthy months in the year, when the air is pleasantly cool and dry, the local fruits are in abundance, and the Valley is generally free from epidemic and other diseases. Snow generally begins to fall about the middle of December, and falls occasionally continue up to about the middle of February, and even later.

PLACES OF INTEREST

In a country where every tract has its own peculiar charm, it is not easy to select any particular areas of beauty for description. Certain places, however, that have come to be recognised as pleasure haunts, in addition to the Dal Lake and the Moghul gardens around it already mentioned, are the Gulmarg, the Pahalgam and the Sunmarg Valleys, where visitors, European and Indian, sojourn for such periods in summer as they can spare from their usual vocations in life to derive the benefit of the pleasant scenery and salubrious climate of the Valley.

Of these places, Gulmarg is very largely resorted to on account of certain amenities which exist there. It is situated at a distance of twenty-eight miles from Srinagar, and is approached by a cart road up to Tangmarg and thence by bridle road of four miles up the hill.

Pahalgam, situated at the head of the Liddar Valley, is at a distance of about sixty miles to the south of Srinagar. It is approached by a road which passes through Mattan (Martand), where the spring of water sacred to the sun is situated, and through Aish Mukam ("the Stage of Pleasure"). From Pahalgam, the Cave of Amarnath—sacred to the god Shiva—is situated at a distance of about thirty-five miles at an altitude of 13,000 ft., whereto pilgrims from all parts of India flock towards the end of July every year.

Sunmarg is at a distance of about fifty miles from Srinagar on the way to Baltistan.

Ganderbal, with its avenues and groves of chinar trees, situated picturesquely on the banks of the river Sindh, is also frequented by visitors, who live in boats or under canvas, and go out generally for shooting and other excursions in the Sindh Valley.

Perhaps one of the prettiest spots is Achhabal garden, dating from the time of the Moghul emperors, and situated about forty miles from Srinagar.

Guide books tell of the magnificent scenery of the Sindh and Liddar Valleys, and of the gentler charms of Lolab. Few countries, it is said, can offer anything grander than the deep green mountain tarn, Konsa Nag, in the Panjal range, the waters of which make a wild entrance into the valley over the splendid cataract of Arabal; while the rolling grass mountain called Tosh-Maidan, the springy downs of Raiyar looking over the Sukh Nag river as it twines foaming down from the mountains, the long winding park known as Yusumarg, and, lower down still, the little hills which remind one of Surrey, and Nilnag with its pretty lake screened by the dense forests, are all worthy to be seen. Apart from their beauty and variety of temperature,

the mountains of Kashmir are of great importance to the country ; they supply water for irrigation, timber, fuel, and the grazing upon which so much of the agricultural prosperity of the Valley depends. As the summer draws on, the sheep and cattle are driven up from the Valley to the woodland glades, and when the sun grows more powerful they pass on to the " Margs," those beautiful stretches of turf ringed round with great forests, which lie at an elevation of from 7,000 to 9,000 feet above the sea. But the best of the grazing is found even still higher up, where the forests of pines and firs cease and the birch trees appear. Gurais is a lovely valley, five miles in length, lying at an elevation of about 8,000 feet above the sea. The Kishenganga river flows through it, and on either side tower mountain scarps of indescribable grandeur. Perhaps one of the most beautiful scenes in the whole of Kashmir is the grove of huge poplars through which the traveller enters the Gurais Valley. The climate is dry and mild ; excellent English vegetables can be grown, and the wild raspberries and currants are delicious.

TRADE

The value of import and export trade of the Kashmir Province for the last official year was £1,116,000 and £832,750 respectively.

| <i>Imports.</i> | <i>Exports.</i> |
|-----------------------------|---|
| 1. Apparel | 1. Kuth root (<i>Saussurea Lappa</i>) |
| 2. Drugs and medicines | 2. Drugs and medicines |
| 3. Cotton, manufactured | 3. Grains |
| 4. Grains | 4. Potatoes |
| 5. Fruits and vegetables | 5. Fruits and vegetables |
| 6. Leather | 6. Hides and skins |
| 7. Liquors | 7. Ghee (clarified butter) |
| 8. Oils | 8. Silk, raw, and cocoons |
| 9. Metals | 9. Wood |
| 10. Salt | 10. Wool and woollens |
| 11. Provisions | 11. Other articles of merchandise |
| 12. Tea | 12. Treasure |
| 13. Sugar | |
| 14. Tobacco and snuff | |
| 15. Spices | |
| 16. Turmeric | |
| 17. Dyeing materials | |
| 18. Stationery | |
| 19. Articles of merchandise | |
| 20. Treasure | |

FORESTS

Kashmir has long been famous for the fertility of its soil, and agriculture claims every fertile plain and valley in the country, and often extends up slopes so steep that terracing is necessary to prevent the soil being washed completely away. But for all that, Kashmir remains and always will remain largely a forest country. With altitudes that range from below 2,000 feet to 17,000 feet—the latter being well above the permanent snow-line—there is scope for a great variety of forest types and species.

THE PRINCIPAL FOREST TYPES AND ZONES.

Beginning at the south-east corner of the Jammu Province, we have some small areas of subtropical bamboo jungle ; behind this, the scrub jungle of the outer foot-hills, with mixed broad-leaved forests in the watercourses ; from 2,500 up to 4,500 feet the chir pine is the predominant species ; then comes

the deodar, and, in places, especially in Kashmir Province, the kairu or blue pine, extending, under favourable conditions, up to 8,000 feet. Above the deodar we have fir forests ascending in places to 12,000 feet, and, above all, birch and scrubby juniper.

In Jammu Province and in the Kishenganga Valley in Kashmir Province, evergreen oaks of various species are found in the different conifer zones, and tree rhododendrons in the lower parts of the fir zone, enlivening the dark monotony. In the deodar and fir zones of Kashmir we find considerable quantities of walnut, ash, maple and horse-chestnut, generally in cool, moist valleys.

Naturally there is not always a sharp line of demarcation between these various zones; there is a certain amount of overlapping. But on the whole the zones are distinctly recognisable.

The only forests that have so far been exploited on a commercial scale are the conifer forests (soft woods), and even in their case there is scope for enormous development.

CRUDE DRUGS

The State forests also produce considerable quantities of valuable drugs. At present the most profitable of these (from the State's point of view) is the costus root or "kuth" (*saussurea lappa*), which is exported to China in large quantities. The root is at present sold to a monopoly contractor, in Kashmir, at £20 per hundredweight, the total annual out-turn being about 1,200 hundredweight, which represents an income of £24,000 from this source. The root is largely used in the manufacture of incense for Chinese temples. It is also largely used to preserve clothes against moth. It is being investigated as a basis in scent manufacture.

Other crude drugs worthy of mention are podophyllum, belladonna, aconite, and valerian.

But perhaps the most important of all is the genus *Artemesia*—the source of the drug santonin. This is found in almost unlimited abundance in the hig er and comparatively dry region of Gurez, Astor, Gilgit, and Ladakh.

The crops of chief importance in Kashmir are :—

Autumnal Crops

| | | |
|----------------|----------------|-----------|
| Rice | Tobacco | Amaranth |
| Maize | Hops | Buckwheat |
| Cotton | Italian millet | Pulses |
| Saffron crocus | Millet | Sesame |

Spring Crops

| | | |
|--------------|-------------|-------|
| Wheat | Opium poppy | Peas |
| Barley | Rape | Beans |
| Tibet barley | Flax | |

SAFFRON

The saffron cultivation of Kashmir deserves to be specifically noted. The "saffron" of commerce, which is used as a colouring matter for various articles of food, both in the East and the West, and prized for several other purposes as well, is the tripartite red stigma of *crocus sativus*. In India, saffron is cultivated only in the Kashmir State territories; and here, too, in only two localities, namely (1) on some alluvial lands (*karewa*) within a distance of fifteen miles from Srinagar, the summer capital of His Highness the Maharaja; and (2) in Kishtwar—on a fairly limited scale.

The flowering time is about the middle of October, and the flowers are the first to appear, followed by needle-shaped leaves which are not prominent to start with. The saffron flowers, with their bluish purple petals and short

stems, then present a very pleasing sight. The artificial appearance of the square beds, each defined in its outline by its own mass of flowers, suggests the illusion to the mind that some landscape artist has laid out a feast of these delicately tinted flowers, in an extensive but ordered arrangement, with infinite care and trouble. And, if the weather is calm and still, as generally happens at that time of the year, there is a distinctly noticeable but not at all overpowering fragrance pervading the whole atmosphere of these fields, which is very pleasing to the senses and produces a subtle vivacity of spirits. This is the origin of the traditional reputation that saffron fields when in flower promote spontaneous and uncontrollable mirth in anyone who visits them. The best time to do this is late in the evening, when one can note their changing shades of colour with the approach of dusk, or in bright moonlight ; for, even though distant fields are not distinguishable, the flower beds close by are distinct enough, and the fragrant atmosphere on a still night is sufficient to make one lose oneself in the enjoyment of the moment.

Saffron is extracted in two ways. Firstly, by cutting out the red stigmas from individual flowers and drying them ; this product is known as “ Mogra,” and is the best in quality. By the second method the whole flowers are dried, then lightly beaten with sticks and thrown into pails of water, when the essential parts of the flower sink to the bottom, and the petals, etc., remain floating and are removed, the operation being repeated three times, though the later extractions are poorer in proportion. This quality of saffron is known as “ Lachha.”

Among the exhibits will be found :—

- (1) Saffron of both “ Mogra ” and “ Lachha ” qualities.
- (2) A plate showing the whole saffron plant in flower, and pressed flowers showing their different parts.
- (3) Photographs showing saffron fields in flower, methods of collection, and saffron flowers as they are dried on calico sheets

FLOATING GARDENS

A peculiar and very interesting form of cultivation is provided by the floating gardens on the Dal Lake, which produce several kinds of vegetables, e.g., melons, tomatoes, water-melons, cucumbers, gourds, etc. Certainly there is nothing like it elsewhere in India, but a parallel has been quoted by Lawrence in his *Valley of Kashmir*, in the “ Chinampas ” of old Mexico. There is no deception about these floating gardens ; they consist of strips about five feet wide of the matted roots of reed-grass, which, along with the soil adhering to those roots, are cut out with spade-like implements, and then actually float on the water. Strength enough to bear the weight of a man is imparted to them by super-imposing one of these strips over another. These strips of floating garden can be towed about, and they are held in place by poles stuck into the lake bed at the four corners. On these strips are placed, at intervals, cones with hollowed-out tops, formed of lake weeds and mud, each cone accommodating two seedlings of the kind selected for production. These weeds are extracted by men in boats working a curved pole round and round in the lake bed, so that a twisted bundle of weeds gathers round its end and is drawn up. The growth of weeds being plentiful, this operation is neither difficult nor very slow. Surprisingly abundant vegetable produce, and of very good quality, is obtained from these floating gardens ; but, on account of being comparatively more watery, they do not quite equal the ordinary garden produce in flavour.

A popular and apparently mystifying saying that in Kashmir land can be stolen is literally true in its application to the floating gardens, and it really

originated in reference to them. Functioning like ordinary soil in productivity, even though having no sub-soil to rest upon, the floating gardens are land for all practical purposes.

Photographic views of floating gardens, as they appear from a distance, from higher ground, and at close quarters, will be found among the exhibits; also views demonstrating that these beds can be towed from place to place by a boat, and that they can bear the weight of a human being. Note the bottle gourds carried under their arms by the two boys and the man standing on the floating gardens in the photographs. Besides, a piece of an actual floating garden strip (slightly smaller than the ordinary size, on account of the trimming it underwent before packing) and six cones (which accommodate seedlings on the floating garden) are exhibited.

VEGETABLES

The "knol-kohl" is the national vegetable, but other vegetables are also grown, and they do well. In Lawrence's *The Valley of Kashmir* is given a list of vegetables grown in Kashmir, as follows:—

| | | |
|-----------|------------|---------|
| Knol-kohl | Chilli | Endive |
| Turnip | Egg-plant | Lettuce |
| Pumpkin | Potato | Carrot |
| Cucumber | Asparagus | Onion |
| Tomato | White bean | |

That was about thirty years ago, and the names of other vegetables now met with in Kashmir readily come to one's mind, *e.g.*, cabbage, cauliflower, beetroot, radish, artichoke, spinach, celery, leek, lady's finger, rhubarb. Lawrence's anticipation that Kashmir might some day export vegetable seeds to India is now nearing fulfilment, for the acclimatised seeds produced by the State's Department of Agriculture are meeting with an increasing demand from Kashmir cultivators, and finding their way into British India as well.

FRUIT

Lawrence has mentioned in his book the indigenous apple, pear, vine, mulberry, walnut, hazel, cherry, peach, apricot, raspberry, gooseberry, currant and strawberry as obtainable "without difficulty in most parts of the Valley," and has given a list of fruits, with their English, botanical and Kashmiri names as follows:—

| English Name | Botanical Name | Kashmiri Name |
|---------------------|---------------------------------|------------------|
| Mulberry | <i>Morus sp.</i> | Tul |
| Apricot | <i>Prunus armeniaca</i> | Tser |
| Cherry | " <i>cerasus</i> | |
| Sweet cherry | " " var. a | Gilas |
| Bitter cherry | " " var. b | |
| Plum | " <i>communis</i> | Alubukhara or Ar |
| Peach | " <i>persica</i> | Tsunnan |
| Almond | " <i>amygdalus</i> | Badam |
| Apple | <i>Pyrus malus</i> | Tsunt |
| Pear | " <i>communis</i> | Tang |
| Quince | " <i>cydonia</i> | Bam Tsunt |
| Vine | <i>Vitis Vinifera</i> | Dach |
| Walnut | <i>Juglans regia</i> | Dun |
| Melon | <i>Cucumis melo</i> | Kharbuz |
| Water-melon | <i>Citrullus vulgaris</i> | Hindwand |
| Pomegranate | <i>Punica granatum</i> | Dan |

As additional fruits, which are now fairly common, may be mentioned the fig, the Spanish chestnut, nectarine, and Cape gooseberry.

The succession of fruit blossoms, in the spring, which brightens the landscape and relieves the dark colour of the fields, as they appear after the melting

away of their covering of snow, ushers in a time of general rejoicing. Among fruit trees, the almond blossom is the first to appear, and gathered together in the almond orchards, in the vicinity of Srinagar, are then found crowds of Kashmiris (men, women, and children) in holiday garb and mood, quietly enjoying cups of tea prepared in their own "Samavars," giving expression to their own musical talents (with or without an instrumental accompaniment) listening to the soft string melodies of an itinerant musician, or just drinking in the beauty of the landscape—the blossoming trees above their heads, a carpet of flower petals practically hiding the green grass below at their feet, the whole country-side dotted about with the flowering peaches and pears in their pinks and whites, and, finally, the towering snow-clad hills all around, surmounted by a canopy of opalescent skies.

The almond crop is remarkable in that, although liable to serious damage from untimely rains and sometimes from late snow during the flowering season, yet in one favourable year it makes up for several years of failure, and yields a very handsome income on an average.

Apples and pears are the commonest fruits of Kashmir, and the yearly export trade with British India in these fruits has been very large. Apart from the varieties indigenous to Kashmir, scores of European varieties (mostly French) have been introduced through the distributing agency of the State's horticultural nurseries; and most of these varieties have done well.

Specimens of some indigenous fruits in a preservative solution are exhibited.

When the blossoming of fruit trees is over and the fields are again green, while the ring of snow on the surrounding hills is still complete, one feels the appropriateness of the metaphorical description of an "emerald set with pearls" which has been applied to the Kashmir Valley, and the mountain ranges which encompass it.

ARBORICULTURAL TREES

Among arboricultural trees, the place of honour belongs to the magnificent "chinar" (*Platanus orientalis*). One of the old Mughul gardens (the Nasim) is entirely a chinar grove; and everywhere over the whole valley these trees are found in camping grounds, where they afford a cool and very welcome shade (due to the thermal action of the warmer air constantly rising up through its palmate-leaved branches) even in the hottest part of the day. If the timber is cut in a radial direction, it exhibits beautiful markings (due to the numerous medullary rays), which render it suitable for decorative furniture. The grain of its timber is close enough to receive a good polish. When the chinar sheds its leaves in the autumn, the latter are collected and turned into a crumbly, leafy charcoal, for use in the fire-pots which the Kashmiris carry in their hands, inside their clothing, during winter.

Leaving out of consideration :—

- (1) The mulberry, which is a fruit tree and also a protected tree in the interests of sericulture—mulberry leaves are the food of silk worms; and
- (2) The walnut, which is also a fruit tree and yields a valuable timber for the wood-carving industry;

there are two other very common arboricultural trees, namely, the poplar and the willow. Poplars are found chiefly alongside roads, and are often planted along the boundary lines of orchards and small holdings. A fine avenue of poplars runs for about seventy miles through the length of the valley, along the main road from Baramulla in the north, which is the entrance to the valley proper, through Srinagar (the capital) to Anantnag (or Islamabad) in the south, which is the principal town in that portion of the valley. The poplar provides a cheap timber for building purposes.

The willow is grown along the river banks, in most of the swampy grounds, and close to dwelling houses in the villages. The wood is used as a cheap fuel, and is also cut into blocks to be exported for making cheap cricket bats. The willows are pollarded at the approach of the cold weather, and the leafy twigs are cut and stored in the forked branches of the pollarded trees to serve as winter fodder for sheep.

All these trees can be rapidly multiplied by planting cuttings in the springtime.

MINERALS

The exhibits shown in the Kashmir Court are intended to illustrate the activities of the State Geological Survey, and comprise minerals, some of which have been known in a general way for long and others that are of more recent discovery. The list, however, is not exhaustive. Very few of these have reached the stage of being worked at present, and none on any adequate scale. The mineral industries that Kashmir may reasonably reckon on remain as yet in abeyance and unrealised, although the list of exploring and prospecting licences constantly being applied for shows that the public are eager enough to begin operations.

On the part of the Survey, exploratory and descriptive work are practically all that has been undertaken so far, and these are only in their early stages. Much, however, has already been done to define accurately the degree of purity and the extent and thickness of a certain number of the mineral deposits which have so far been examined. The few large-scale plans, sections, and photographs selected for exhibition, and which accompany the samples and specimens, will serve to explain the methods employed by the Survey for ensuring adequate representation. It will be seen that many of the useful minerals of the State occur in enormous quantity, that some are of great purity, whilst others, whose purity is not so great, may still be adequate for many purposes after proper treatment. It is allowable to hope, therefore, that at no distant date conditions will be ripe and opportunities will be taken advantage of for a full and proper administration of these important matters.

COAL AND LIGNITE

The chief minerals exhibited are coal and lignite, baunite, copper ore, gold, lead and silver, chromite, graphite, gypsum, ochre, marble, slate, talc (steatite), aquamarine, rubellite, green tourmaline and smoky quartz.

In Kashmir Province no real coal is known, but very recently the Mineral Survey has discovered in the *Karewa* (Pliocene) deposits of the Kashmir Valley extensive and thick beds of lignite. A large sample of this is shown in the exhibit from Nichahom, where exploration by pits and the drill, now in progress, has revealed the presence of some hundred millions of tons of it. Much more is confidently expected in the surrounding *Karewa* rocks which extend throughout the valley for sixty miles. It is not a high-class fuel, but it will have its uses, and may furthermore improve in quality on better acquaintance. Whether employed for factory or household purposes, or for the manufacture of gas, oil and tar, the degree of usefulness of this fuel may depend on how it succeeds in taking the place of wood, but sooner or later, as other fuel resources become depleted, it must certainly have its day. Samples of the low-temperature carbonisation products from the lignite, including the carbonised residue, briquettes formed from the latter, and fractionated spirit, phenols, kerosene, Diesel oil and other products, are exhibited with the lignite.

SILK INDUSTRY

MULBERRY CULTURE

The soil of Kashmir is favourable to the growth of the mulberry tree. It grows with vigour, provided moderate care is taken by the peasants to protect it from being damaged by cattle. The tree is the property of the Kashmir Government, and may not be cut down without permission. Every effort is being made to increase the number of trees, since the quantity of silkworm eggs distributed to the rearers has almost reached the limit that the existing trees admit of. Since 1914 thousands of trees have been distributed yearly from the mulberry nurseries for plantation on ravines, slopes and other waste lands of the State, according to the size of the adjacent villages and number of the cocoon rearers. The trees are allotted by the village headman to each cocoon rearer according to the amount of eggs he receives.

SILKWORM REARING

This branch of the industry was started on scientific lines in 1898. During that year 415 ounces of eggs were distributed amongst 400 rearers, and produced 469 maunds of cocoons. This quantity was gradually increased till in 1904, 26,000 ounces of eggs were distributed amongst 11,000 rearers, and yielded 16,000 maunds of cocoons, the average for these seven years working out at 16,000 ounces of eggs distributed, 4,900 rearers, and 9,550 maunds of cocoons produced. From 1905 to 1913 the corresponding averages were 30,200 ounces of eggs, 22,000 rearers, and 28,000 maunds of cocoons. From 1914 up to this year the averages are: Eggs, 38,200 ounces; rearers, 44,800; and cocoons, 33,300 maunds.

The eggs are issued by the Department shortly before they are ready to hatch. The quantity issued is about 42,000 ounces. The eggs are given to the peasants free, according to the size of their houses and the number of their family. The number of silkworm rearers enlisted and registered up to date on the Departmental books is about 60,000, but probably about 180,000 to 200,000 men, women, and children are directly engaged in this work. As each rearer receives the eggs, he takes them to his house and places them in a room kept at a temperature of 75 degrees Fahrenheit. After four or five days the small worms hatch out, and are fed on the mulberry leaf which is allowed to the rearers free of cost. The time from hatching to the spinning of the cocoon is about thirty to thirty-five days. The worms spin their cocoons in dry straw or mustard stalks placed round the beds in the room. The worms are left five days to complete their cocoons. The cocoons are gathered and brought into the silk factory at Srinagar, where they are received and weighed. The rearers are then paid their dues. It is worthy of note that whereas formerly persuasion and pressure were needed to get the peasants to rear the silkworms, the difficulty now is to limit them to the real amount of eggs which they are capable of rearing.

With regard to increasing the cocoon crop, the introduction of modern methods and various other improvements is contemplated by the Government.

As the cocoons arrive at the factory they are inspected, weighed, and then taken to the sechoirs where they are dried and stored away. About 500 men, women, and children are employed daily on the work of sorting the cocoons.

SILK REELING

The reeling of cocoons on scientific lines was started in 1898, when two filatures, containing each 212 reeling basins were constructed. This number was gradually increased, till in 1903 there were ten filatures containing a total number of 1,864 basins. During this period the average output was about 40,000 lbs. of silk, 17,000 lbs. of inferior and waste silk. During the period

1905 to 1913 the average output was 145,000 lbs. of No. 1 silk and 88,000 lbs. of inferior and waste silk. In this year, as already mentioned, the disastrous fire occurred. After the fire, five filatures containing 304 reeling and 152 cooking basins each were constructed on the most modern lines possible. The basins in these filatures are heated by electricity, and the cooking basins by steam. The reels are split, turned by electricity, and incased in boxes. At present the boys can reel five or six skeins at a time. After the silk has been reeled, it is collected and brought in for examination, certain skeins are picked out for testing, the remainder are twisted into hanks and packed in bales. About 3,500 people are daily employed in these filatures.

The average output for the last six years has been about 175,000 lbs. of No. 1 silk and about 100,000 lbs. of inferior and waste silk.

An experiment has recently been made with a set of four reeling basins of the most modern type ordered from Italy. This experiment has proved successful, and as a result of it the entire replacement of the existing machinery is under contemplation. The silk reeled on these basins is reported to be equal in quality to the best Italian and French.

GRAINAGE

The history of this branch of the industry dates back to 1906, when a small experiment on scientific lines was first made, and out of 160 lbs. of cocoons, 10½ ounces of eggs were produced, from which a crop of 12 maunds of cocoons was obtained. This was an encouraging result, and it was decided to increase the quantity. In 1907, 174 ounces were produced, and this quantity was gradually increased till in 1909, when a proper grainage had been built, the quantity was raised to 3,721 ounces. In 1916 a second grainage was established, and the quantity further increased to over 7,000 ounces. The result from these eggs still proving satisfactory, a third grainage was started in 1918, with the result that about 20,000 ounces of eggs are annually produced, which is nearly half the quantity required for distribution in the country. The system adopted for the reproduction of silkworm eggs has been by selection of the very best cocoons brought in by the rearers. The cocoons are strung up till the moth emerges, when it is caught and placed in a muslin bag to lay its eggs. The dead moths are then examined under a microscope to see that they are free from disease, and after the examination all the passed bags are hung up again in another room. When the examination of all the bags (about 2,200,000) has been completed, the eggs are washed and packed into one-ounce and half-ounce boxes and placed in the hibernation rooms till the following spring, when they are distributed to the peasants.

The system adopted in Kashmir for the production of eggs, known as the Pasteur system, is working satisfactorily, and only cellular seed is produced.

This short summary does not pretend to give a full history of the industry, but is meant to convey to the public some small idea of what is considered to be the largest raw silk manufactory in the world.

ARTS AND CRAFTS

SHAWLS

Placed among beautiful surroundings, the people of Kashmir, though simple in almost all their requirements of life, have been endowed with marvellous artistic taste and a keen aptitude for the representation of the beauties around them. Kashmir, indeed, has been noted for its art from antiquity, and Kashmir shawls are said to have been admired, even in the days when Krishna went to the court of Kurus as a delegate from the Pandus, whilst they were also the most cherished treasures of the beauties of Cæsar's Court.

There are two kinds of shawls—one, the “ Kani,” or the loom-woven kind, which is woven in small pieces which are then joined together with an almost imperceptible stitch. The other is the “ Amli,” in which a plain pashmina is covered over by a beautiful and elaborate pattern in needlework. The idea of the design to be executed is prepared by a “ Naqash ” (drawing) master, but is not converted into a painted drawing. The shawl weaver gets this design transcribed on paper in symbols (each of which signifies the number of threads to be used, and their colour) by the “ Khahan Wool,” or key writer. The weaver then sets to work with a tray full of different coloured pashmina thread reels, and works out the intricate designs and delicate blending of shades from his “ key ” with marvellous, though mechanical dexterity. He does not know the design of the shawl he works at till the whole piece is ready in all its grace and beauty. There are various shawl designs. The most ancient and famous one is the “ Cone ” or “ Badam ” pattern, with which every lover of Kashmir shawls is well acquainted.

The beauty of the shawl, apart from its fine and exquisite workmanship, lies in the completeness of its Orientalism in design and colour, and not in the inartistic mixture of Eastern workmanship with Western designs. It is hoped that all lovers of art and all those who visit the Valley of Kashmir will refrain from carrying away such ridiculous and cheap productions of a debased art, or encouraging its continuance in the country, since it is not really Oriental or Kashmiri, but a monstrosity which does no good either to the buyer or the seller. The art of shawl weaving is not, however, quite dead yet ; it only needs proper treatment and encouragements for its revival, and this it is now receiving at the hands of the authorities. Adapted to the needs of modern fashion, but rich in its wealth of true ancient artistic perfection, the shawl industry will yet regain its lost position in the markets of the world, and be a source of inspiration to all true students of the beautiful and sublime.

Almost any garment or fashion to suit any nationality can now be prepared in Kani (loom) or Amli (needlework) shawl work in all its different styles, such as “ Dorokha,” *i.e.*, with similar design on both sides of the shawl, with single, double or triple border in various floral designs ; or the “ Jamawar ” shawl or “ Badami ” pattern of Kashmir. These articles are not only things of beauty to be admired, but are also of great use and durability. They last for generations, and become heirlooms that any one may be proud of possessing.

EMBROIDERY

In connection with the manufacture of beautiful shawls, exquisite needlework is a necessary essential. Some of the finest embroidery work is found on old chogas, or coats, which even now are worn by most respectable Kashmiris on gala days.

The increasing demand for cheap work and the constant influence of uninformed and inartistic buyers of embroidery, has helped the extinction of the fine craftsman of an earlier day. The real embroiderers almost always remain in the background, shut away in their squalid huts, endeavouring to produce what the dealer finds a market for, and almost forgetting the true art of their forefathers. Oriental richness of pattern, colour, and design are losing all their charm for the dealer, simply because the introduction of commonplace patterns from drapers' catalogues, or other equally undesirable sources, them more ready cash and gives them the consolation of having brings done a large trade—but to the detriment of really artistic embroidery in the country.

Needlework as is done in Kashmir is perhaps hard to beat, and I am sure amli work has no equal. All the purchasers have to do is demand it, and encourage its continuance, and not let it be sacrificed to cheapness and coarse

inartistic imitation. The Kashmiri embroiderers have a natural aptitude for blending colours, and if left to themselves, and encouraged, are able to produce most elaborately worked and beautifully embroidered patterns in their true Oriental richness of designs. The aniline dyes are a great deal to blame for reducing the durability and the perfect blend of colour in most of the articles put for sale. It is hoped that with the help of the artistic buyer, and the interest taken by the authorities, the art will not take long to revive in all its past glory and perfection.

CARPETS

The carpet industry in Kashmir dates as far back as 1423 and was introduced by weavers imported from Central Asia.

At present there are large carpet manufacturing concerns in Kashmir which are doing a very profitable trade with Europe and America. Most of the designs now produced are made from copies of old Oriental carpets that were published by the Imperial and Royal Austrian Commercial Museum, but the success and the complete revival of the old design and colour rest mainly with the buyer, who should just demand the proper stuff and not be satisfied by cheap imitations.

The carpet industry is showing very hopeful signs at present, and silk carpets, with as much as 400 stitches to the inch, have been manufactured, and even more closely woven carpets are now under manufacture. Faster dyes are also being used, and before long it is hoped that Kashmir carpets will vie favourably with any other hand-woven carpets in the world, if they have not already done so.

PÂPIER MACHÉ

This art was introduced into Kashmir from Persia towards the latter half of the eighteenth century, by a Persian, who emigrated to Kashmir and taught the art to the people there. Papier maché articles are made out of paper pulp applied in superposed layers and closely stamped together in a wooden mould of the required shape. This, when dried and hardened, retains the shape on extraction from the mould. It is then covered over with cloth, and glued all over. Next it is passed on to the painter, who first colours the whole ground to suit the design that is in his mind, and then with his paint brushes (which were originally made of the shawl-goat hair, but at present are mostly the European sable hair brushes) he starts painting a floral design or the delicate and fine cone design, more widely known as the shawl pattern. The painter has no painted design to copy from, but just paints the piece from his imagination; and it is no small wonder how he succeeds in producing a uniform design, symmetrical and balanced at almost every point. The fact of the worker not having a design to work from, adds to the novelty and value of this particular art. It is a treat to see these men sitting in their little rooms, with a few small dishes of paint and a brush, painting away, all from their imagination, and producing a work of real beauty showing a wonderful blending of colours and details in drawing.

The designs now produced are very varied, the chief being :—

Shawl, floral, dragon, jungle scenes, chinar, rumal, gold (with black, white, or red), and the old Persian rose.

There is a very large variety in shapes and sizes, and one can get articles of any shape and reasonable size in the form of vases, writing sets, boxes, candlestands, teapots, bowls, and photograph frames, etc.

This industry is one of the best specimens of Kashmir art, and one which attracts all lovers of art and colour. A few good pieces placed in a room never fail to add colour and a rich tone to the surroundings.

WOOD CARVING

Of the different kinds of woodwork done in Kashmir, walnut wood carving is about the most famous and beautiful.

There are perhaps few who have heard of Kashmir and not been told of the exquisite wood carving made there. This industry of Kashmir is one which can, at the present time, be called the premier industry of the country. There is a large demand for it, as the productions are not only beautiful, but useful and durable.

All articles of furniture, such as tables, chairs, screens, boxes, teapoys, trays, etc., are turned out in various designs.

Originally the most artistic designs made were the minutely delicate surface carvings in floral, shawl, or geometrical patterns, but this form of carving has been largely replaced by bolder carving in relief of the various flowers found in the valley, and the dragon design, imported from Lahssa. This bold, perforated carving is certainly a work of great skill, and well illustrates the peculiar care and patience which the worker exercises in modelling all the intricate and delicate details of stalk, leaf, and flowers out of what was a simple block of wood. This form of work is commonly known in Kashmir as "undercut," and is in great demand. The earlier patterns of minute work are, of course, more difficult to do, needing greater patience and accuracy. But the real art of Kashmir wood carving should only be judged by reference to one of these pieces, which, though worked in wood, looks quite as delicate and artistic as the detail in an old Kashmir shawl.

The workers do all this exquisite carving with locally-made instruments, and it is not uncommon to see a boy working at one of the pieces with merely a nail flattened and sharpened at the end, which he keeps tapping with a bit of wood whilst copying the design placed before him on paper. In this way, with his indigenous tools, he works out any pattern, however difficult or intricate, that may be given to him.

METAL WORK

Silver work has attained a great deal of fame in India, and has also been much appreciated in Europe. The best work is done in patterns copied from old shawls, and is the most artistic and difficult of all the designs turned out. At present the designs most in demand are repoussé work in different floral patterns, and these have almost replaced the real old Kashmiri pattern.

Silver-work is entirely hand-made, and when executed in really Oriental designs, compares most favourably with the best machine-made articles, and eventually comes cheaper too.

Silver enamel work in blue and green enamel is also made in Kashmir nowadays, and the articles manufactured present a very pleasing appearance. The demand for this kind of work is increasing daily.

WICKER WORK

For a long time past certain articles of common use in local homesteads have been made of wicker. A few years ago experiments were made in growing English willow in Kashmir, with a view to establishing a regular wicker-work industry. The experiments met with success, and the English willows took very kindly to the fertile soil of Kashmir, and yielded willow with longer twigs than they produce even in England. Lunch baskets and flower-baskets, chairs and tables, and various other articles of common use are being produced at present in the Technical Institute of Srinagar in elegant designs and perfect workmanship, and it is hoped that in course of time this industry will grow and the articles produced will find a ready market locally as well as in other places in India.

| Articles Exhibited. | | Name and Address of Exhibitors. | | |
|---|--|---|---------|------------------|
| Food Products. | | | | |
| GRAINS— | | | | |
| Cereals (of 58 different varieties) | | The Agricultural Dept. Kashmir Govt. | | |
| Paddy (of 36 different sorts) | | | | |
| Pulses (of 21 different varieties) | | | | |
| DRY FRUITS AND FRUITS— | | | | |
| Almonds (24 sorts) | | Pears | | |
| Apples | | Spanish Chestnuts | | |
| Walnuts | | Trel | | |
| (26 different varieties) | | Quince | | |
| SAFFRON— | | | | |
| Sericultural Products. | | | | |
| Cocoons (" dupest," golden, pierced, white and yellow) | | Sericultural Dept., Kashmir Govt. Srinagar & Jammu. | | |
| Cocoon fluff | | | | |
| Silks (white and yellow, in various sizes) | | | | |
| Silk waste (" Sarnakh," yellow and white) | | | | |
| Silk worm chrysalides | | | | |
| Silk worm eggs | | | | |
| Photographs of silk industry | | | | |
| Zoological Exhibits. | | | | |
| Specimens of the following are exhibited :— | | The Kashmir Govt., and the P. W. College Jammu. | | |
| Barking deer | | | | Pamir sheep |
| Bharal | | | | Sambhar |
| Goral | | | | Serow |
| Great Tibetan sheep | | | | Tahr |
| Himalayan ibex | | | | Tibetan antelope |
| Kashmir stag | | | | Tibetan gazelle |
| Markhar | | | | Urial |
| Musk deer | | | | |
| Forest Products. | | | | |
| (1) TIMBER— | | | | |
| Samples of 50 different varieties are exhibited. | | Kashmir Government. | | |
| A detailed list of Kashmir timbers, with their uses and other particulars, can be obtained at the stall. | | | | |
| (2) MODELS AND TOYS— | | | | |
| Models of agricultural implements | | Do. | do. | |
| Bedsteads | | Egg holders | | |
| Bullock carts | | Flour mills | | |
| Candle stands | | Musical instruments | | |
| Cradles | | and | | |
| Domestic utensils | | Stud buttons | | |
| are exhibited. | | | | |
| (3) MINOR FOREST PRODUCES— | | | | |
| Various products used as drugs, disinfectants, dyes, for tanning leather, for making ropes, varnishes and soaps, are shown. | | Do. | do. | |
| Minerals. | | | | |
| Bauxite | | Kaolin | Do. do. | |
| Chromite | | Lignite | | |
| Coal | | Makol | | |

| Articles Exhibited. | | Name and Address of Exhibitors. | |
|---|---------------------------|---|--|
| Minerals—<i>contd.</i> | | | |
| Copper ore | Ochres | Kashmir Government. | |
| Fuller's earth | Polishing powder rock | | |
| Graphite | Pyrites | | |
| Gypsum | Talc | | |
| Hemalite | | | |
| Manufactured Articles. | | | |
| Articles made of gypsum (alabaster), such as toys, candlesticks, electric lamp stands, boxes and match boxes. | | Do. do. | |
| Toys and paper weights of talc, and various kinds of things made of green serpentine are exhibited. | | | |
| Art Industries. | | | |
| PAPIER MACHE— | | | |
| Ash trays | Lamp stands | A. S. Technical Inst., Srinagar. Ganemede, Srinagar. Habib Joo. Jubbar Khan & Son. Ghulam Mohideen. Manwar Joo & Son. Safdar Hussain. Srinagar Museum. | |
| Boxes | Mirror frames | | |
| Book shelves | Paper racks | | |
| Bowls | Photo frames | | |
| Candle stands | Powder boxes | | |
| Card boxes | Pen boxes | | |
| Clock cases | Soap boxes | | |
| Collar boxes | Standard lamp stands | | |
| Cigar and cigarette cases | Stamp boxes | | |
| Envelope cases | Tables | | |
| Frames | Teapots | | |
| Flower vases | Tobacco boxes and jars | | |
| Handkerchief boxes | Toys | | |
| Hairpin boxes | Writing sets | | |
| Miscellaneous articles, such as blotters, nests of boxes, shields, sticks, surahies, etc. | | | |
| The articles noted above are exhibited in several different kinds. | | | |
| Metal Ware. | | | |
| (Brass, copper, brass and copper, plain and carved gilt, as well as inlaid with precious metals, etc., in hundreds of varieties.) | | | |
| Bangles | Ornamental pots and vases | A. S. Tech. Institute, Srinagar. Jubbar Khan & Sons. Ghulam Mohideen & Son. Habib Joo & Sons Hari Prasad Wali, 3rd Bridge, Srinagar. Munawar Joo & Sons. Ragho Ram & Son. Santa Ram. Subhana & Son. Srinagar Museum. | |
| Basins | Plates and knives | | |
| Bowls | Penholders and pen trays | | |
| Butter dishes | Pestle and mortar | | |
| Boxes | Photograph frames | | |
| Brushes | Powder boxes | | |
| Coffee pots | Rifles | | |
| Candle stands | Rosewater sprinklers | | |
| Card boxes | Samovars | | |
| Chairs | Shields | | |
| Cigar and cigarette boxes | Statues | | |
| Coffee jugs | Stamp boxes | | |
| Flower vases | Swordsticks | | |
| Guns | Scent pots | | |
| Hand washes | | | |

Metal Ware—contd.

Articles Exhibited.

Name and Address of Exhibitors.

| | |
|-------------------------|------------------|
| Hanging lamps | Spittoons |
| Hookah and hookah parts | Trays |
| Images | Tumblers |
| Milk jugs | Teapots |
| Nut crackers | Temples |
| Oil lamps | Tobacco boxes |
| | Umbrella handles |

Clay Work.

| | |
|--------------|-----------------|
| Cups | Surahies |
| Jars | Tea sets |
| Flower vases | Tiles |
| Statues | Timepiece cases |

A. S. Tech. Institute.
Gulam Mohideen & Sons
Santa Ram.
Wazir Sobha Ram.

Wood Carving.

| | |
|---------------------------|--|
| Bellows | Panels |
| Blotters | Paper racks |
| Book slides | Paper knives |
| Book stands | Pipe racks |
| Book shelves | Photograph frames |
| Bowls | Powder boxes |
| Bowl stands | Revolving book cases |
| Boxes | Screens (folding and non-folding) |
| Cake stands | Smoking cabinets |
| Candle stands | Stationery cabinets |
| Chairs | Sticks |
| Cigar and cigarette boxes | Tables, occasional, smoking, tea, working and writing) |
| Cigar tables | Table nests |
| Collar boxes | Tie boxes |
| Dumb waiters | Tobacco jars |
| Fire screens | Toys |
| Footstools | Vases |
| Glove boxes | |
| Hookah funnels | |
| Lamp stands | |
| Mantelpieces | |
| Mirror frames | |

A. S. Tech. Institute,
Srinagar Ganemede,
Srinagar.
G. M. Jubbar Khan & Son.
M. S. Habib Joo & Son.
Munawar Joo & Son.
Ragho Ram & Son.
Subhana & Son.
Srinagar Museum.

In different varieties and in varying degrees of workmanship.

Wood Turning.

| | |
|-------|----------------|
| Balls | Flower vases |
| Bowls | Hookah funnels |
| Boxes | Tobacco boxes |

Stone Ware.

| | |
|-------------------|-------------------------------|
| Bangles | Knife handles |
| Bowls | Necklaces |
| Buckles | Paper weights |
| Buttons | Pendants |
| Cigarette holders | Pestle and mortar |
| Cups and saucers | Powder boxes |
| Chairs | Snuff bottles |
| Eggs | Teapots |
| Flower vases | Umbrella handles |
| Images | Vases (with and without lids) |
| Inkpots | |

Ghulam Mohideen & Son, Third Bridge, Srinagar.

| Articles Exhibited. | | Name and Address of Exhibitors. |
|--|---------------|---------------------------------|
| Leather. | | |
| Boots | Money bags | The Kashmir Leather Works. |
| Brush cases | Slippers | |
| Cushions | Shoes | |
| Change bags | Writing cases | |
| Textiles. | | |
| Carpets | Namdaz | Ghulam Mohideen & Son. |
| Cushions | Shawls | |
| Gubbaz | | Madan & Sons. |
| Of various colours and designs. | | Srinagar Museum. |
| Embroidery. | | |
| Bed covers | Money bags | Ali Jan & Sons. |
| Bedspreads | Rumals | Gulam Md. Suddrudin. |
| Blouses | Saries | Ghulam Modideen & Son. |
| Covers | Scarves | Khawaja Abdul. |
| Curtains | Sezanies | Guffor Handoo. |
| Chogas (kimonas) | Scarves | Habib Joo & Son. |
| Cushions | Shawls | Kadir Jan & Sons. |
| Flag handkerchieves | Shoes | Sona Khan & Son. |
| Kamarbands (waist-bands) | Table cloths | Srinagar Museum. |
| Ladies' dresses | Tea cosies. | Wazir Sobha Ram. |
| Furs. | | |
| Bedroom slippers | Slippers | The Kashmir Leather Works. |
| Caps | Socks | |
| Gloves | Waistcoats | |
| Precious Stones. | | |
| Amethyst | Jade | Kashmir Government. |
| Agate | Ladakh stone | |
| Beryl | Lapus lazuli | |
| Cat's eye | Serpentine | |
| Cornilian (red and yellow) | Tiger stone | |
| Crystal | Topaz | |
| Green stone | Turquoise | |
| Works of Art in Precious Stones and Jewellery. | | |
| Bangles | Locketts | Ghulam Mohideen & Son. |
| Bracelets | Muff chains | |
| Brooches | Necklaces | |
| Buttons | Pendants | |
| Charms | Powder boxes | |
| Earrings | Snuff boxes | |
| Inkpots | Smoking pipes | |
| Links with studs | Sticks | |
| Manuscripts. | | |
| Certain very rare books in Sarada, copies of Quran sheriff and Persian poetry books are exhibited. | | Kashmir Government. |
| Painting. | | |
| Fifteen different portraits and a landscape painting are on view. | | Srinagar Museum. |
| | | Ghulam Modiheen & Son. |

Photographs and Photograph Cards.

About 150 different views, depicting scenery and life in Kashmir are exhibited. Srinagar Museum.
Mukherjee.
A. S. Tech. Institute.

Miscellaneous.

- (1) Wooden models of barges, doongas (boat houses), Shikar and Kashmir streets.
- (2) Currency notes of the denominations of Rs. 5, 10, 50 and 100, of the old Kashmir currency.
- (3) Some old stamps.
- (4) Grass baskets, shoes and slippers, and
- (5) Pieces of floating gardens are exhibited.

KASHMIR—PART III.

List of Exhibitors in the Kashmir Court.

Ali Jan & Son, Shawl, Embroidery and Carpet Merchants.
A.S. Technical Institute, Srinagar.
Department of Agriculture, Kashmir Government.
Director of Industries, Kashmir Government.
Director of Sericulture, Kashmir Government.
Forest Department, Jammu and Kashmir.
Gaffoor & Joo & Sons, Carpet Merchants.
Ganemedi.
Gulam Mohideen & Son, Carpet Dealers, 3rd Bridge, Srinagar.
Habib Joo.
Hari Prasad Wali.
Jubbar Khan & Son.
Khawaja Gani Shah, A.
Khawaja Gulam Md. Suddrudin, Shawl Merchant, 3rd Bridge, Srinagar.
Khan Bahadur Sheikh Gulam Hussein & Co.
Khawaja Abdul Gaffoor Handoo.
Kadir Jan & Son.
W. Lambert.
Madan & Sons, Carpet Merchants, Srinagar.
Manawar Joo & Sons.
Mukerji (A.S. Technical Institute).
Pandit Ganesh Das.
Pandit Nundalal Muttoo.
P.W. College, Jammu.
Ragoram & Son.
Safdar Husein.
Santa Ram.
Srinagar Museum.
Sona Khan & Sons.
Subhana & Sons.
The Kashmir Leather Works.
Vishnu Nath & Sons, Photographers, 3rd Bridge, Srinagar.
Wazir Sobha Ram.

KATHIAWAR STATES

KATHIAWAR is the peninsula or western portion of the Province of Gujarat, Bombay. Its extreme length is about 220 miles and its greatest breadth about 165 miles, the area being 23,445 square miles. Of the total about 20,882 square miles with a population of 2,542,535 is the territory forming the political agency under the Government of Bombay, established in 1822, having under its control nearly 200 separate states whose chiefs divided amongst themselves the greater portion of the Peninsula.

BHAVNAGAR.

This State lies at the head and west side of the Gulf of Cambay.

The chief products of the State are grain, cotton and salt. The chief manufactures are oil, copper and brass vessels and cloth. The Bhavnagar State Railway is 205 miles in length. The capital of the State is the town and port of Bhavnagar, which has a good and safe harbour for shipping and carries on an extensive trade as one of the principal markets and harbours of export for cotton in Kathiawar.

JUNAGADH STATE.

This State has an area of 3,336½ square miles and an average revenue of about 50 lakhs.

NAVANAGAR STATE, on the southern shore of the Gulf of Cutch, has an area of 3,971 square miles. The Maharajah of Navanagar is a Jadeja Rajput by caste, and belongs to the same family as the Rao of Cutch. The Jadejas originally entered Kathiawar from Cutch, and dispossessed the ancient family of Jethwas (probably a branch of Jats) then established at Ghumli. The town of Navanagar was founded in 1540. The present Jam Sahib is the well-known cricketer, H. H. Jam Sahib Shri Ranjitsinhji Vibhaji, who was born in 1872 and succeeded in 1907. The principal products are grain and cotton, shipped from the port of the State. A small pearl fishery lies off the coast.

JUNAGADH.

| Articles Exhibited. | | Exhibitor. | |
|---------------------------------|------------------|------------|--------|
| Model of a Guzaret bullock cart | Indian dress | Junagadh | Govt., |
| Articles in wood | India-made locks | Junagadh. | |
| Bead works | Old arms | Do. | do. |
| Ivory stick | Powder horn | Do. | do. |

WATSON MUSEUM, RAJKOT.

| | | | |
|-------------------------|-------------------------|---------|---------|
| Models of bullock carts | Brass torch | Watson | Museum, |
| Model of a wooden well | Brass waterpot | Rajkot. | |
| Brass oil lamp | Stone mortar and pestle | Do. | do. |

NAWANAGAR STATE.

Textiles.

| | | | | | | |
|---|----|----|----|----|----|-------------------|
| Silks | .. | .. | .. | .. | .. | Ghamji Chellaram, |
| Silk embroidery | .. | .. | .. | .. | .. | Jamnagar. |
| Silk handkerchiefs | .. | .. | .. | .. | .. | Do. |
| Silk handbags | .. | .. | .. | .. | .. | Do. |
| Silk scarves, with and without gold flowers | .. | .. | .. | .. | .. | Do. |
| Table cloths | .. | .. | .. | .. | .. | Do. |
| Gold brocade for shoes | .. | .. | .. | .. | .. | Do. |

Art and Artware.

| Articles Exhibited. | Exhibitor. |
|---|-----------------------|
| GOLD AND SILVER JEWELLERY— | |
| Anklets in silver | 1. Gorindji Banaraj. |
| Armlets | 2. Kansara Jeram |
| Cuff buttons.. .. . | Vithalja. |
| Ear rings | 3. Soni Kanji Raoji. |
| Necklaces (diamond, pearl and turquoise) .. | 4. Otamchand Bhavan |
| | All of Jamnagar. |
| BRASS AND GERMAN SILVER WORK— | |
| Bouquets | Gulab Jagjwan. |
| Locks | Raghu Nath Ramji. |
| Nutcrackers | Jamnagar. |
| Toys | |
| MISCELLANEOUS— | |
| Embroidered pictures | 1. Nurubhai Ishmail- |
| Musical instrument (Latoi) | jee. |
| Incense sticks | 2. Vydyia Shanker |
| Indigenous medicines | Prasedji. |
| Indigenous scents | 3. Garana Mahmud & |
| | Umar. |
| | 4. Popat Kashir Shah. |
| | 5. Dhiraj Ram |
| | Jeshankar. |
| | All of Jamnagar. |

BHAVARAGAR STATE.

Textiles.

Carpets

Wood Work.

Boxes

Screens

Dishes

Arts and Artware.

IVORY—

Models of

Bottle

Cage

Stick

Lotus flower

Inkstand

Rosewater sprinkler

Pin boxes

Birds

Boxes

Cigarette pipes

MISCELLANEOUS—

Samples of imitation vegetables, fruits and fruit,
plants, toys and spices.

DHAR

A framed exhibit sent by Her Highness the Maharani is exhibited

KOLHAPUR

A painting in glass beads done by Her Highness the Dowager Maharani.

KHAIRPUR (Sind)

THIS is a State in the Bombay Presidency with an area of about 6,000 square miles and a population of a quarter of a million. The soil is for the most part arid, and the country partakes generally of the characteristics of the neighbouring desert regions of Sind. The people follow mostly agricultural pursuits, the only industries of note being pottery and lacquer work. At the stall of this State in the Exhibition will be seen a demonstration of these arts.

Textiles.

| | | |
|--|-------------------|----------------------|
| Embroidery consisting of specimens of— | | Khairpur Mirs: Govt. |
| Ladies' head covers | Silk carpets | |
| Gowns | Silks for apparel | |
| Silk shirts | Winter caps | |
| Silk bodice cloths | Pictures | |

Art and Artwork.

| | | |
|-----------------------------------|-------------------|----|
| LACQUERWARE—Comprising models of— | | |
| Wooden turrets | Collar boxes | |
| Water pitchers | Cups and saucers | Do |
| Flower vases | and Baby's cradle | |

CARPENTRY—

Model of Persian water wheel.
 Model of Sindhi water wheel.
 Model of cargo and passenger boats.
 Chair with ivory work, and panalquin.

Blacksmith Work.

Walking sticks and knives.

Pottery.

Flower pots.
 Glazed earthenware.
 Model of an ancient mosque.

Do.

Industrial Advances.

Samples of indigo and crude sodium carbonate.

MYSORE

Area : 29,469 square miles ; population, nearly 6 millions.

Resources.

THE principal resources of the State in which there is extensive foreign trade are gold, chrome and manganese among minerals, oilseeds, silk, cotton, sandalwood, hides and skins, coffee, timber and several forest products.

2. Minerals

Among minerals besides gold, the most important are chrome and manganese in the supply of which Mysore takes a leading part throughout the world. Chrome is extracted chiefly from mines in the Tumkur and Hassan Districts, and manganese in the Shimoga District, but these minerals are to be found elsewhere in the State. Iron ore of very good quality has been discovered in various parts of the State, but the best specimens are found in the Bababudan Hills. A factory has recently been started at Bhadravati for the manufacture annually, from 15,000 to 20,000 tons, of pig iron with charcoal produced by the destructive distillation of wood. The acetate of lime and the wood alcohol manufactured are of good quality, for which there is a steady and growing demand from foreign markets. There are good deposits of kaolin, magnesite and asbestos, in which new industries are now being developed. Sand suitable for glass manufacture is also available. There are many varieties of building stones, chiefly granites, which range from the ordinary to the most exquisite types. The Palace at Mysore is built entirely from Mysore stones and gives an idea of the great variety and wealth of such material in the State. Difficulties of transport stand in the way of any large trade being built up in them. The State is also rich in ochres and siennas, and efforts are being made to develop an industry in paints and distempers. The Geological Department in Mysore has made a comprehensive survey of the mineral resources in the State, and published much valuable information on the subject. A complete collection of minerals of commercial value has been made and a map showing the distribution has been printed.

3. Textile Industries.

The textile industries afford, next to agriculture, employment to the largest number of people. In regard to textile industries, the State commands an unusually favourable position. Silk, cotton and wool, are all produced in abundance within the State. The annual production of raw silk is estimated at one million pounds, valued at one and a half crores of rupees. The quantity of cotton produced annually is about 50,000 bales of 400 lbs. each, a large proportion of which yields a higher staple than the bulk of Indian cotton. Sheep-breeding is carried on on a large scale in Mysore, and it is also the centre of the trade in sheep skins in Southern India. Wool is thus locally available. The Mysore State has therefore provided occupation from time immemorial to a large number of weavers, who have attained an extraordinary measure of skill in the weaving of finer counts and costly silk fabrics. As the bulk of the weavers in Mysore are engaged in the manufacture either of coarse or high counts they have been able to withstand the competition of the mills, the number of which has been increasing steadily in recent years. The total value of the cotton goods produced in the State by the handloom weavers is estimated at about one and one-third million pounds, of which woollen and silk goods respectively account for about £120,000 and £500,000. Carpet making has been an important industry in Mysore from time immemorial, and some of the specimens produced are of extraordinary beauty and finish.

SILK.

Mulberry can be grown in nearly all parts of the State, and the climate is also suitable for the silk worm, which is of a Poly-voltine species. The silk worm rearers are able to take about six to eight crops per annum. The actual area under mulberry cultivation is about 50,000 acres, but the scope for expansion is almost unlimited. The cocoons are now reeled in cottages with the help of very primitive appliances. Considerable attention has been devoted by the Government to the improvement of the silk industry by providing facilities for the supply of disease-free seed, by carrying on experiments on a large scale for the improvement of the silk worm, and by the introduction of up-to-date methods of reeling. The silk reeled is utilised either locally or in the adjacent parts of the Madras Presidency. When reeled in modern filatures, its quality is found to be equal to that of the best Canton silk, and it is expected that Mysore will shortly be able to take an important place among the suppliers of European markets. Silk waste is also exported in large quantities to Italy, where it is converted into spun silk.

OTHER FIBRES.

Sisal hemp thrives in the State, and plantations of this fibre are being started. Sun hemp is grown as a green manure and used in making bags and sacks. There are many forest fibres of commercial value which are not utilised on account of the difficulties of extraction. The potentialities of the State in yielding valuable fibres have been hardly touched.

4. Oilseeds.

Among other commercial crops produced in the State, the most important are oilseeds, coffee, sugar cane and tobacco. Except linseed, which is grown in small patches, all other oilseeds produced in India, such as ground nut, gingelly, safflower, castor, rapeseed, etc., are grown in abundance in the State. Oilseeds are being raised as a subsidiary crop. Correct statistics of actual area under cultivation are not available, but the total quantity of oilseeds produced annually is estimated at about 80,000 tons. About 5 to 10 per cent. of the oilseeds produced locally is used in the extraction of oil in the village oil mills, known as ghanas, but oil crushing machinery of the Anderson Oil Expeller type has been largely introduced in the State, which has given considerable impetus to the export of oil and oilcake. Coconut is also produced on a large scale, the soil in all parts of the State, except in regions of heavy rainfall, being well suited to it, but it is only grown in small blocks intermixed with other crops. The total value of coconuts annually produced is estimated at over £300,000. With a view to stimulating the cultivation of this crop, large areas of land have been made available by Government from lands containing date palms and those reserved for the grazing of Government cattle. Very little of the coconut is used locally for the extraction of oil, the bulk of it being consumed for edible purposes, for which it has acquired a high reputation, and is much in demand in the markets all over India. There are many trees, such as Hongey, Ippe, Dhupa, which yield valuable oils, and there are others of which the oil is not extracted on account of the difficulties in deoderising. These latter resources are sufficiently extensive to form the nucleus of important industries in the hands of competent enterprise.

Essential Oils.

The State is also rich in raw materials such as sandalwood, cardamom, cinnamon leaf, vetiver, rosha and lemongrass, from which valuable essential oils can be prepared, and there are three large factories, two of which, owned by Government, are engaged in the distillation of sandalwood oil, and the other a private factory for making essential oils from cloves, cinnamon leaf,

patchouli, etc. Sandalwood is a monopoly of the State, which commands nearly three-fourths of the entire production in the whole world. The annual output of sandalwood is estimated at 2,000 tons, and the value of the oil extracted ranges from £125,000 to £200,000 annually, according to the quantity put on the market.

ALLIED INDUSTRIES.

Industries with oils as the basis are in an infant state. There is a Government factory for the manufacture of toilet and washing soaps, and several small private factories which confine themselves to the manufacture of washing soaps, and a small factory for the manufacture of candles has been recently established.

5. Jaggery and Sugar Manufacture.

The total area under sugar cane cultivation is about 50,000 acres. Very little sugar is produced, sugar cane being converted mostly into jaggery. The climate is ideally suited for growing sugar cane. The State Agricultural Department has done a great deal in the improvement of sugar cane cultivation by introducing new varieties of cane and improved methods of cultivation, and by popularising the use of oil cake and chemical manures. Sugar cane is now grown in very small blocks by individual peasants, and there is great difficulty, owing to this cause, in organising the industry on a factory basis. New reservoirs are being constructed, where it is intended to provide suitable facilities for the establishment of sugar plantations.

6. Coffee and Cardamom.

Coffee is one of the most important commercial crops in the State. It is grown in the elevated hills of the Kadur and Hassan Districts. Its quality is equal to the best Arabian coffee. The area exceeds 108,000 acres, and the annual output is estimated at 10,000 to 12,000 tons, valued at nearly £1,000,000. The bulk of this coffee is exported to Europe through Mangalore, being sent dressed with the husk to meet the requirements of the English consumers, and as pounded coffee to the Continental buyers. Cardamom is also grown largely in the State, some of which is wild. Tea has also been tried and found to thrive well.

7. Other Commercial Groups.

Though large quantities of tobacco are grown, yet, due to imperfect curing and want of selection of proper varieties, very little of it is used in the manufacture of cigars and cigarettes, the latter of which is an important industry in the State. There is little foreign trade in areca, which is a valuable garden crop, in the regions bordering on the Western Ghats. Of fruits, mangoes and oranges are produced on a large scale. Though there is great scope for the cultivation of fruits, the industry has not received sufficient attention. A fruit canning and preserving factory has been established.

8. Hides and Skins and Tanning Materials.

Owing to the abundance of tanning materials, such as tangadi bark and myrobalans, the State has always been one of the principal markets for hides and skins for foreign countries. The hides and skins are sent half tanned. A tannery has been established for the manufacture of chrome tanned leather. The total value of hides and skins exported from the State annually amounts to, on an average, about £400,000.

9. Forest Timbers.

The Mysore forests contain very superior varieties of timber, the best known of which are rose and teakwood. There are, however, nearly 143 varieties of wood in the Mysore forests, of which nearly 45 contain hard

woods suitable for various manufacturing purposes. A complete collection of these woods has now been made and their commercial possibilities demonstrated. The quality of many of the Mysore woods and their suitability for the various purposes requiring a high standard of quality, have now been successfully proved. There are also soft woods suitable for the manufacture of matches, in which an industry is being started. The skill of the Mysore carpenter, combined with the excellence of the material, afford great scope for the manufacture of high-class furniture, for which there should be a large demand in foreign countries. There is a Government factory, and also a private factory, which specialise in the manufacture of such furniture.

Both bamboos and grasses suited for the manufacture of paper pulp are found in abundance, but the industry has not as yet attracted capital. The forests contain large supplies of myrobalams and other tanning materials, nux vomica, oil seeds, oleoresins.

10. Sandalwood and Other Carving.

The abundance of sandalwood, which lends itself readily to the most intricate carving, of ivory suited both for inlaid work and carving, and of the halle wood (*wrightia tinctoria*), which takes a fine lacquer polish and can be easily turned, has given rise to the three most important artistic industries in the State, viz., sandalwood carving, ivory carving, and inlaid work and lacquer work. These industries have been greatly stimulated and developed by the help given by the Department of Industries to adopt new designs, use better tools, and create a larger market by opening a sales depot. These articles have now reached a high standard of excellence, and are expected to have a large home and foreign market. Mysore has always been famous for its stone carving. Though confined in the past mostly to architecture in temples, of which there are some exquisite specimens in the famous temples at Halebid, Belur, Somnathpur and other places, the art has again been resuscitated, and many extraordinary specimens can be seen in the Mysore Palace. Metal carving has been similarly revived.

11. Lac.

There are several species of trees on which the lac insect thrives. The cultivation of lac was an important industry in the past which had lapsed into decay owing to the want of scientific study of the habits and environments of the insect, the diseases and pests to which it was liable, and the best methods of propagation. The subject is now being carefully studied, and efforts are being made on a large scale to develop this industry. Improved methods of purifying and refining lac have been introduced, and its utilisation for various manufacturing purposes is being investigated.

12. Machinery Newly Introduced and Required for the Future in the State.

The resources of the ordinary cultivator are limited, and agriculture suffers greatly from want of capital, the uncertainty of the seasons and the indebtedness of the cultivating classes. Efforts have been made to introduce on a large scale improved ploughs and agricultural implements suited to the needs of the ordinary agriculturist, some of them having been specially designed to suit local conditions. The Government of His Highness the Maharaja of Mysore have inaugurated a liberal policy of granting loans in order to encourage the use of machinery for agricultural and industrial purposes, and a sum of nearly Rs. 15 lakhs has been given as advances during the present decade. Use of improved implements, such as ploughs, cultivators, threshers, etc., is steadily increasing. There are enterprising cultivators who use oil and gas engines for irrigation, and there is a demand also for tractors. Power driven machinery for dealing with agricultural products, such as rice and flour mills, sugar cane crushing, etc., is coming largely into use. There is

likely to be a great demand in future for improved implements and machinery for various agricultural purposes, and for steam, oil and gas engines, for generating power where electric power is not available. The supply of cheap electric power in the cities of Bangalore and Mysore has created a demand for motors of various horse powers. Side by side with the development of cotton and woollen mills, the weaver has to be assisted in getting suitable preparatory machinery under better labour-saving conditions. There is great scope for the introduction of better winding, twisting, sizing and warping machines. As the future prosperity of the handloom industry is greatly dependent on the assistance given to the weavers to get their materials ready for the use of the looms and the organisation of the markets, it will be necessary to open factories to carry on subsidiary processes. Small factories with 6 to 12 power looms run by electricity are becoming popular, and the demand for such machinery is steadily increasing. The introduction of filatures for reeling silk is likely to create a good demand for Mysore silk and stimulate the production of raw silk, leading to a great demand for machinery in various stages of preparing silk. Spun silk from silk waste, for which there is a good demand in India, is likely to be undertaken, and a silk waste spinning plant will be required. The manufacture of lametta and gold thread has already been started in the State. The oil-pressing industry is on the threshold of a large development, and will stand in need of machinery. The manufacture of sulphuric acid, refining of wood alcohol, paper pulp, sugar and wood working, represent other industries in which the people of the State are now interested, for which machinery will be required.

Conclusion.

The State was the first in India to generate electricity by using water power, which has enabled it to develop important industries, such as textiles, gold mining, oil and flour milling, etc., on a large scale. It has large facilities for further development of hydro-electric power. The cheap power that these developments will be able to supply may be expected to lead to continuous industrial development in the State. It is rich in materials, such as silk, hides and skins, oilseeds, coffee, for which there is a great demand in foreign markets. It contains many skilled artisans able to manufacture artistic products of a high standard. It possesses many advantages for the development of raw materials. The Department of Industries and Commerce is anxious to utilise the opportunity offered by the British Empire Exhibition not only to stimulate trade in all materials required by foreign countries and the artistic works of its skilled artisans, but also to build up connections with manufacturers of machinery and others that can assist in the future development of the economic resources of the State.

GENERAL NOTES ABOUT THE EXHIBITS

THE principal articles in which there is much foreign trade from the State are minerals, such as gold, chrome and manganese, oil seeds, hides and skins, sandalwood and other essential oils, silk, cotton, timber and other forest products. Arrangements have been made to provide a fully representative collection of these articles. In one shelf are arranged all the mineral ores in Mysore, namely, gold, quartz, iron ore, manganese, chrome, magnesite, asbestos, kaolin, and the great variety of building stones, such as granites and marbles. Mysore is rich both in the higher and lower grades of manganese and chrome ore, and the increasing demand for the lower grade ores has now given Mysore a prominent place amongst the

world's suppliers. The exhibits from the Kolar Goldfields Mining Board consist of a graphical representation of gold production in the State. The Workington Iron Co. have sent complete samples of their manganese ores, and also some of the important products containing Mysore manganese. Mysore is the only State of which a detailed geological survey has been made, and a map of its mineral resources published. These maps are also exhibited.

A complete collection of the products of the Mysore Distillation and Iron Works, consisting of specimens of wood used, the charcoal produced, the pyroligneous liquors, the grey acetate of lime, wood alcohol, tar, flotation oils and other distillates, have been displayed. The superiority of the Mysore charcoal pig iron, which nearly approaches in quality the Swedish iron, is evident even to a casual glance of the bar shown, and some articles made from it have been displayed. The markets for the by-products, such as acetate of lime and wood alcohol, are at present largely foreign.

Timber is another commodity produced in the State for which there are great potentialities of foreign trade. The Mysore timbers contain 143 different varieties, and these are displayed in decorative panels mounted by gables so as to set forth not only the characteristics of the wood, but to add to the decorative effect of the Mysore Court as a whole. A large number of sample boxes has been prepared containing some of these woods for distribution to *bona fide* enquirers, and full information regarding these resources has been collected.

Even more important than the supplies of unwrought timber are the potentialities of sending carved furniture and other manufactured articles to foreign countries. Mysore is very fortunate in having several species of timber, such as rosewood, teak, sandalwood, white and red cedar, haley, ebony and many others, which lend themselves easily either to a high polish or for being turned and carved. In order to show the possibilities of elaborate carving on rosewood a number of articles have been prepared, but of these the most conspicuous are a huge sideboard and cabinet illustrated with figures from ancient carvings, and a screen containing views of the Public Office Buildings, the Seshadri Memorial Hall, and the Palace at Bangalore. There are magnificent specimens of ebony and rosewood inlaid with ivory or mother-of-pearl. Among ivory inlaid articles are several trays, octagonal tables containing exquisite floral and other designs, but the most attractive exhibit is a small cabinet with ivory inlaid figures after the classic Oriental style, prepared by Mr. Imdad Hussain, of Mysore. So also is a table screen exhibited by him. Rosewood with shell inlaid work, consisting of trays with passages from Persian poets, is a new method of inlaying introduced in the State during the past five years.

The great improvement in lacquerware work can be seen from the specimens of toys, snakes, fruits, such as cocoanuts, grapes, pomegranates, which are very true to nature. Owing to the introduction of power-driven lathes there is now a large scope for the development of the trade in toys, and the Department of Industries is now engaged in the problem of suggesting improved designs and methods of work.

Sandalwood carving shows the greatest variety. There is a model of the Halebid Temple, in which an attempt has been made to reproduce the laborate carving on its facades. A new departure has been made in the manufacture of caskets and other articles by the introduction of new designs taken from panels in old temples and well-known scenes of Mysore. Many useful articles, such as jewel boxes, smoker's sets, etc., have been displayed.

There is a fine display of silver articles exhibited by Messrs Krishniah, Chetty & Sons, consisting of tea sets, vases, caskets, etc. An elaborately-

carved silver casket containing scenes from the life of Sri Krishna has now been specially prepared for the Exhibition. Elaborate brass carving used to be carried on in Nagamangala in the past, but the industry is now nearly extinct. Brass trays carved with scenes from the Ramayana and the Mahabharata, and a good collection of elaborately-carved images, are exhibited.

There is a considerable amount of trade between Mysore and Europe in hides and skins. A complete collection of half-tanned and chrome tanned hides is exhibited, so, also, the tanning materials used, such as myrobolams, tangadi bark, etc.

Among agricultural products only such varieties as are likely to lead to development of foreign trade are exhibited. Oil seeds, coffee, the Mysore coprah (which is exclusively used for edible purposes as such), tamarind, tobacco and fibres, are all exhibited.

The article that is likely to be of the greatest importance from the point of view of foreign trade in the future is silk. Though the Mysore State produces more than Rs. 1,50,00,000 worth of silk, very little is now exported, being all consumed locally, as the methods of reeling do not suit the silk to the requirements of European weavers. The Sericultural Department has prepared special cabinets to show the improvements made in the breed of silk worms in Mysore, the difference in quality between cottage reeled and machine reeled silk, and the manner in which the two adapt themselves to the various processes. An up-to-date filature was started two years ago in the State. Private enterprise has come forward to take up the industry on a large scale. Filature silk finds a ready sale in the European markets, and a very large and important industry is being built up.

Some specimens of gold thread and lametta using the silk are exhibited, which is a new industry in the State.

A large variety of jacquard silks, sadies, etc., have been exhibited, as also very fine specimens of nakki work.

The Bangalore Woollen, Cotton and Silk Mills, Ltd., have sent a complete collection of their cotton and other goods.

The carpets manufactured in the Mysore Jail are renowned throughout the world, and the two magnificent specimens now displayed have been most exquisitely designed and woven.

The annual exports of sandalwood oil from the State are valued at £130,000 to £170,000, and special attention has been paid to provide a striking exhibit of the article, as it forms an important Government monopoly. The Essenflour Products Ltd., have exhibited a complete collection of essential oils, for which there is a large foreign market. There is a good collection of scents made in the Government soap factory and some private manufacturers.

The Mysore Fruit Canning Syndicate have exhibited their preserved fruits, jams, and chutnies.

The exhibits have all been collected and arranged by the Director of Industries and Commerce in Mysore, Bangalore. Visitors to the Exhibition may collect additional information from Mr. S. G. Sastry, B.A., M.Sc. (Lond.), the State officer in charge of the Mysore Court. The Director of Industries and Commerce in Mysore, Bangalore, India, will be glad to receive any enquiries from the visitors concerning the articles exhibited.

MYSORE

Articles Exhibited.

Exhibitor.

(1) Agricultural Products.

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| Paddy, rice, ragi, navane, wheat, jola, green gram, horse gram, Bengal gram, beans, ground-nut seeds, hongey seeds, castor seeds, linseed, gingelly seeds, hippe seeds, til seeds, ground-nut oil, hongey oil, castor oil, gingelly, hippe oil, oil cakes from the above oil seeds, cocoanuts, white sugar, brown sugar, jaggery, mustard, tamarind. | The Dept. of Industries Commerce, Bangalore, India. |
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(2) Preserved and Manufactured Food.

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| Ragi flour | Mrs. Boreham, Bangalore, India. |
| Curry powders, chutneys and pickles .. | Mr. Andrews, South Parade, Bangalore, India. |
| Tinned condiments and fruits | The Mysore Canning and Condiment Factory, Ban- galore, India. |
| Preserved Indian fruits and special Indian jams | The Mysore Fruit Canning Syndicate, Bangalore, India. |

(3) Spices, etc.

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|---------------------------|--|
| Pepper, cardamoms | The Dept. of Industries Commerce, Bangalore, India. |
| Coffee | (1) Leslie & Anderson, 14, Billiter Street, London, E.C.3. (1) T. H. Allan & Co., 17, Gracechurch St., London, E.C.3. |

(4) Minerals.

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| Ore specimens of gold quartz, iron, man- ganese, chrome, magnesite, mica, asbestos, kaolin, granites and marbles | The Director of Geology, Bangalore, India. |
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(5) Forest Products.

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| (a) Forest Timbers, Teak, Bagi, Bilvara, Dindiga, Burga, Tadasalu, Nandi, Jalari, Honne, Kadaga, Matti, Hebhalasu (Wild Jack), Bobbi, Devadaru (red cedar), Kare (ebony), Swami (redwood), Dhoopa (white Dammar), Kagli, Ankole, Kamaraka, Bikke, Maddi, Gorivi, Geru, etc. | The Conservator of Forests in Mysore, Bangalore, India. |
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¶ *Note.*—All the above specimens and several more are used in the two panels and archways of the Mysore Court. The botanical names are published in a separate list, which can be had on application.

(5) Forest Products (*contd.*)

Articles Exhibited.

Exhibitor.

- (b) Minor forest products, such as lac, tanning materials, etc.

- (1) The Conservator of Forests in Mysore, Bangalore, India.
(2) The Chamundi Lac Works, Chennapatna, Bangalore District.

(c) SPECIAL FOREST EXHIBIT.

A model of the Khedda operation, as conducted during the visit of H.R.H. The Prince of Wales. (Khedda operation is a mode of catching wild elephants.)

The Conservator of Forests in Mysore, Bangalore, India.

(6) Textile and Other Products.

- (a) Samples of silk cocoons (various breeds), mulberry leaves, cottage reeled silk, filature reeled silk, photographs of the above processes and operations.
(b) Samples of several varieties of cotton grown in Mysore State.
(c) Sisal hemp and other fibres

- The Dept. of Agriculture (Sericulture Section), Bangalore, India.
The Dept. of Industries & Commerce, Bangalore, India.

(7) Textile Exhibits.

- (a) Swadeshi coating, Swadeshi skirting, under-vests, socks, rugs, druggets, door mats, samples of pile carpets.
(b) Silk of different patterns, socks, mufflers, girdles and borders, cushion covers, etc.
(c) Indian ladies' dress material like sarees made of cotton, silk, silk and gold thread, in beautiful patterns.
(d) Knitted and embroidered dress and dress materials, in cotton, silk, and artificial silk
(e) Window curtains, table covers, cushion covers, hemstitch work, embroidery, delicate lace-work, decorative and service silks and linens
(f) Tapes, twines and navars, etc.

- The Bangalore Woollen, Cotton & Silk Manufacturing Co., Bangalore, India.
Messrs. Binny & Co., 122, Leadenhall Street, London, E.C.4.
The Salvation Army (The Tata Silk Farm), Basavanagudi, Bangalore City, India.
The Govt. Weaving Factory, Bangalore, India.
(1) The Govt. Weaving Factory, Bangalore, India.
(2) Mrs. Pavanabai, Malleswaram, Bangalore, India.
The Dept. of Industries & Commerce, Bangalore, India.
The Dept. of Industries & Commerce, Bangalore, India.

(8) Metallurgical Industries.

Articles Exhibited.

Name of Exhibitor.

- (a) Charcoal pig-iron
Note.—The Mysore Iron Works (owned and controlled by the Government of Mysore), happens to be the first and the only factory to manufacture charcoal pig-iron on a large scale in the whole of Asia. Charcoal is obtained by the destructive distillation of wood and the bye-products of wood distillation, such as pyro-ligneous acid (crude and distilled). Settled tar, soluble tar, crude methyl alcohol, refined methyl alcohol, acetone, acetic acid, grey-acetate of lime, solvent oils, guicacol, creosote oils, etc., are all exhibited. Also the chief varieties of timber carbonized are also exhibited.
- (b) Special specimens of gold quartz, photographs of gold mining operations at Kolar (India), charts and models.
- (c) Special samples of manganese ores obtained from the Mysore State, and samples of manganese steel.

The Mysore Iron Works,
 Bhadravati, Shimoga
 District, South India.
 The Govt. of Mysore,
 Bangalore, India.

The Kolar Gold Mining
 Board, Kolar Goldfields,
 India.
 Messrs. John Taylor & Sons,
 6, Queen Street Place,
 London, E.C.4.
 The Workington Iron Co.,
 Workington.

(9) Leather and Leather Goods.

Samples of hides, skin and leather (country-tanned and chrome-tanned), and also leather goods and articles.

- (1) The Dept. of Industries
 & Commerce, Ban-
 galore, India.
 (2) The Mysore Chrome
 Tannery, Bangalore,
 India.

(10) Essential Oils.

Samples of essential oils, like sandalwood oil and oil of clove, cinnamon, cinnamon leaf, cardamom, patchouly, ginger grass, Ajwan seeds, coriander, vetiver, etc., etc. Also samples of thymol.

- (a) Essenflour Products,
 Ltd., Mysore, India.
 (6-8 Beauchamp Street,
 London, E.C.1.)
 Also The Mysore Govt.
 Sandalwood Oil Dis-
 tilleries, Bangalore and
 Mysore, India.

(11) Pharmaceutical Products.

Samples of crude drugs and pharmaceutical preparations from them—belladonna, colotropis, jambul, jalap, pinapora, cinconna, kalodana, gempian, alepris, etc., etc. (30 exhibits).

The Mysore Pharmaceu-
 ticals, Ltd., Bangalore,
 India.

(12) Inks.

Samples of different inks

Saliah's Warehouse, Ltd.,
 Ink Manufacturers, Ban-
 galore, India.

(13) Soaps and Perfumes.

- | Articles Exhibited. | Exhibitor. |
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| (a) Samples of household and toilet soaps—Sandal, Gulab, Jasmine, Baba Rose, New Lavender. | The Govt. Soap Factory, Bangalore, India. |
| (b) Samples of high-class handkerchief perfumes—Jasmine Special, Indira, Raja-Mahal, Sundari, Santal-Ranjan, Wanee, Eau-de-Cologne and Special Lavender. | Do. do. |
| (c) Indian scents and perfumery articles, like scented sticks, perfumery tablets, incense powder, etc. | T. L. Upadhyaya, Sugandhakari, Mysore. |

(14) Brass Ware and Brass Art Work.

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|---|---|
| Samples of brass work, like elaborately carved trays, Hindu gods, specimens of birds and animals, and also some household articles. | The Dept. of Industries & Commerce, Bangalore, India. |
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(15) Goldsmith and Silversmith Work.

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| Samples of goldsmiths' and silversmiths' work—Caskets, statues, cups, flower vases, table ware, ornamental silver and gold articles, toys, models, souvenirs, plates, embossed silver images, images and idols of worship in India. The articles are all beautifully designed, exquisitely carved, and perfectly executed. | (a) C. Krishnayya Chetty & Sons, Bangalore City. (b) Phalajrai Ramanarayan & Co., Bangalore City. |
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(16) Lacquer Ware.

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| (a) Lacquerware Toys—Swinging cradles, imitation tea sets, powder boxes, tops, rattles, sets of Indian cooking vessels, imitation fruits and flowers, pop-guns, engines, motor cars, humming tops, watch stands, saucers, needle cases, imitation vegetables, etc. | (a) The Govt. Industrial School, Chennapatna, Bangalore District. (b) The Dept. of Industries & Commerce, Bangalore, India. |
| (b) Lacquerware—Serviceable articles like rulers, penholders, flower vases, powder boxes, etc. | The Dept. of Industries & Commerce, Bangalore, India. |

(17) Inlay-Work.

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| Rosewood and ebony inlaid work, with ivory and mother-o'-pearl—Almiras, drawing room screens, teapoys, tables, caskets, trays with floral designs, cigar boxes, ladies' writing cases, trays with scenes from Omar Khayyam, jewel boxes, etc. | (a) The Chamarajendra Technical Inst., Mysore, India. (b) Imdad Hussein, Mysore, India. (c) The Government Art Workshops, Bangalore, India. |
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(18) Carving and Woodwork.

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|---|---|
| (a) Ivory Carving—Caskets, swamy figures, umbrella handles, visiting card cases, daggers, ladies' handbag handles, beads (carved and ordinary), powder boxes, toys, bangles and statues, fretwork, etc. | The Govt. Art Workshop, Bangalore, India. |
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(18) Carving and Woodwork (*contd.*)

Articles Exhibited.

- (b) Sandalwood Carving—Caskets, glove boxes, jewel boxes, handkerchief boxes, smoking sets, cigar and cigarette boxes, visiting card cases, bridge boxes, figure carving, specially carved panels, album covers, a replica of the famous Halebid Temple, powder boxes, photo frames, walking sticks, etc.
- (c) Rosewood and ebony carving—A magnificent rosewood carved cabinet, rosewood carved screens, carved tables in different designs, Durbar chair, grandfather's clock.
- (d) Models of the new palace at Mysore and the Library building of the Indian Institute of Science, Bangalore.
(Models constructed out of the different timbers found in the Mysore forests.)

Name of Exhibitor.

- (a) The Gudigar Co-operative Society, Sagar, South India.
- (b) Dottoba Rao, Sorab, South India.
- (c) The Government Art Workshop, Bangalore, India.
- (a) The Chamarajendra Tech. Institute, Mysore.
- (b) The Government Art Workshop, Bangalore, India.
- The Government Art Workshop, Bangalore, India.

(19) Musical Instruments.

Two Veenas—Elaborately decorated with ivory inlaid work

The Dept. of Industries & Commerce, Bangalore, India.

(20) Special Exhibits.

- (a) Model of a patent float releaser for gauging the velocity of water in river beds.
- (b) Carpets—Two large magnificent specimens of carpets. Also several small carpets.
- (c) Relief map of Mysore with the economic products of Mysore carefully marked.
- (d) A special set of photographs of Mysore State.
- (e) Trophies and Shikar Exhibits—
 - (1) Elephant tusks mounted on ebony, with a mirror.
 - (2) Elephant head with an abnormal growth of a pair of tusks.
 - (3) Tiger heads, tiger skins, bison heads, etc., etc.

- Y. Ramaswamy, B.E., Asst. Engineer, Mysore Govt., Public Works Department, Mysore, South India.
- (a) The Central Jail, Bangalore, India.
- (b) The Dept. of Industries & Commerce, Bangalore, India.
- The Dept. of Industries & Commerce, Bangalore, India.
- Do. do.
- (a) Theobald Bros., Mysore, India.
- (b) Van Ingen Van Ingen, Mysore, India.

Two ivory tusks in full, mounted on an ebony pedestal with silver work.

The Conservator of Forests, Bangalore, India.

PATIALA STATE

PATIALA, the largest of the Phulkan States and the premier sixth State in India (with a revenue of £800,000) lies scattered amongst the hills and plains of North West India, the chief part being in the Eastern Plains of the Province and parts reaching the Simla hills on one side and the Narnaul on the other. It covers an area of nearly 6,000 square miles with a population of over 1,500,000, distributed amongst the 3,500 villages and fourteen towns. The North Western Railway traverses the north of the State through Rajputana and Sirhind and the Rajpura-Bhatinda branch passes through the centre. Though agriculture is the chief mainstay of the majority of the population and the chief source of revenue for the State, the new impetus towards industry in recent times is making rapid strides in tapping the State's mineral and other resources. The principal crops are grain, barley, wheat, sugar cane, rape-seed, cotton and tobacco. The State Bank with its branches, together with the organisation of Co-operative Societies all over the State is playing an important part in stimulating and improving the cottage and rural industries. At present there are more than a score of ginning and milling factories in Patiala.

The large sums of money spent over the construction of irrigation canals are being got back in the way of agricultural prosperity. The extensive forests found in the State not only forms the nucleus of big game hunting for which the State is so well known, but also provides one of the chief sources of revenue in its valuable timber.

Amongst other industrial activities, mention must be made of the Saltpetre industry, mainly under State control, gold and silver lace, and silk sash industries which have been revived of late, the products of which are becoming more and more popular both at home and abroad. Narnaul marble has established its reputation by being able to compete with Italian marble in quality and variety. Experiments in rearing silkworms and reeling of silk has so far been successful, and very soon Patiala may claim its position amongst the chief silk-growing provinces in India.

From the point of view of education, Patiala claims to be the only place in Northern India that can boast of free primary and higher education, and large sums of money are spent in keeping the schools and colleges fitted with up-to-date laboratories and an efficient staff.

Some of the trophies of the Maharajah in game hunting are World's records ; a few are exhibited in the Patiala Court, amongst which include lions, tigers, panthers, bears, deer and wild boars.

Food Products.

Wheat (Bot. *Triticum Vulgare*)—

- (a) Patiala Selected No. 1.
- (b) Wadanak (*triticum Durum*).

Cotton—

- (a) Patiala Selected Rosea.
- (b) American acclimatised.

Rice—

- (a) Basmati.
- (b) Chahara.

Oil Seeds—

- (a) Linseed. (b) Sarson. (c) Taramira. (d) Toria. (e) Til.

Chillies (2 types).

Turmeric.

Grams (3 different types).

Spices and Pulses, etc.

Forest Products and Articles of Wood.

Specimens of timber and wood (panel and booklet size).
Charts showing wood useful for making combs.
Specimens of wood used for pencils and penholders.
Specimens of wood suitable for making match boxes and splints.
Walking sticks of bamboo.
Engraved work of art on bamboo sticks.
Specimens of wooden toys.
Specimens of wood and bark pulp.
Specimens of wood used in various parts of rural machinery.
Indigenous drugs and medicines with botanical specimens.
Grass pulp.
Fibres.
Essential oils.
Gums and resin.
Rubber and rubber ingredients.
Honey and wax with hive and bee specimens.

Minerals.

| | |
|-------------|----------|
| Iron ore. | Calcite. |
| Copper ore. | Nitre. |
| Gypsum. | Mica. |

Stones and Articles of Stone.

Ornamental marble table-top covers of assorted colours.
Marble chess table top.
Marble table paper weights of different shapes and colours.
Marble Qalamdan.
Limestones of Narnaul and Chandigarh.

Chemical Products.

Yellow Dye P"
Pine-needle oil.

Shikar and Stuffed Animals (Natural History and Taxidermy).

Lions, tigers, panthers, bears, hog deers in a group, garelles, wolves, hyena, wild boars, urial, black bucks, ant eaters, tiger skin rugs, Indian lion skins, panther rugs, snow leopard rugs without heads, Tibetan lynx skins without heads, panther skins without heads, cheeta head mounted on shield, blue bulls, sambar, wild boar heads, paper cutting picture, feather pictures and stuffed birds.

Miscellaneous.

Automatic chess recorder and time-keeper.
Automatic charsa (one model).

Textiles.

Gold and silver laces of different varieties.
Blankets, bed sheets, towels, table-cloths, patties, banarsi dopatas, gumtees, lined gabroons, tussar single and double lungies, karandi, phulkaries and four-fold bed sheets (Chotahies), etc. Silk work of Patiala, viz., Izarbands (Pyjama string) and rope, etc.

Gold, Silver and other Metal Wares.

Hookah, surahis (goblets), sarotas (nut crackers), pawas (bedposts), shoes, gagars (water-pots, iron), gold and silver buttons and other articles, etc.

Miscellaneous.

Fossils, sundial, calendar, cooker, bed sheet, golden temple, photograph of Maharaja Karam Singh Sahib, iron coat, helmet, dhal (shield), chakr, breastplates, photos of Sahib Singh Maharaj, Maharaja Nirandar Singh, Delhi Fort, Shah Alam, Aurang Zeb, Guru Baba Nanak, Baba Ala Singh Ji and Maharaja Amar Singh Sahib. Swords, hand gloves, dagger lock, photos of Golden Temple, Qutub Minar, bridle of Narnaul, sandles, tea-trays (brass), bags, sejbands, and other old curiosities connected with the history of Patiala.
Old coins and stamps.

Pictures.

Maharaja Nirandra Singh Sahib.
Procession of Shah Jahan with his sons.
Procession of Aurangzeb.
Dara Shikoh.
Procession of Ram Chandra Ji Maharaj.
Sasi and Panu.
Sea and Rakhshas.
Mirza Aziz Kokal Tash.
Protection of Gaj Raj.
Princess Baz Wali.
Krishna Ji and Radhka Ji.
Maharaja Farid Kot.
Council of Maharaja Rajindra Singh Bahadur.
Asaf Jah.
Maraja Ramchandra and Lakshman.
Maharaja Ram Chandra and Lakshman seeing a monkey show.
Lok Machayan Krishna Ji Maharaj.
Bahadur Shah Badshah.
Maharaja Farid Kot.
Lat Sahib.
Farrukh Seer.
A woman standing.
Farruckh Seer.
Hand-made picture of His Royal Highness the Prince of Wales.

TONK

THIS is a State situated partly in Rajputana and partly in Central India with an area of about 2,553 square miles, of which 1,114 are in Rajputana and 1,439 in Central India, and with a population of about 3,000,000.

The country is partly mountainous and partly level and enjoys on the whole a dry and healthy climate, although malarial fevers prevail during and after the rains. The ruling family are Pathans of the Buner tribe.

The chief occupation of the people is agriculture. The principal crops are jowar, wheat, grain, maize and sesamum ; poppy is also cultivated to some extent. Irrigation is almost entirely from wells.

Good cotton cloth is woven throughout the State, while the manufacture of felt rugs and saddle cloths deserve mention. Plated utensils, guitars and pen cases carved in wood and inlaid with ivory are other articles of manufacture which call for notice.

| Articles Exhibited. | Name and Address of Exhibitors. |
|---|---------------------------------|
| Kendas (chair or cushion covers) of various designs and sizes | Tonk State Jail |
| Durries (cotton carpets) of different sizes and patterns. | Do. |
| Prayer carpets of variegated design | Do. |
| Kaleen (cotton carpet) of coloured design .. | Do. |
| Woollen durrie (carpet) in coloured design .. | Do. |
| Namdahs (woollen mats and carpets) in various designs | Do. |

Note.—The price of each exhibit is marked on it, and each exhibit bears a registered number. In ordering articles all that is necessary is to quote the class and number of the exhibit. Articles can be made in all sizes and designs, and if any departure from the size or pattern of an exhibit is desired, particulars should be given with the order. Orders should be sent to S. T. Hollins, Esq., Judicial Member, Tonk, Rajputana, India, or to Captain Webb, I.A., c/o The East India United Service Club, 16, St. James's, London.

TRAVANCORE

TRAVANCORE is situated at the south-western part of the Indian Peninsula. Cape Comorin is its southernmost extremity.

Area.

The area of the State is 7,624 square miles. It is smaller than Wales by about 250 square miles, and is about one-eighth of the size of England and Wales together.

Population.

The population of the State, according to the census of 1921, is a little over 4,000,000.

Physical Features.

Travancore is one of the most picturesque parts of India. The lofty mountains on the east, the rivers flowing through meandering hills and valleys towards the sea, the unbroken chain of backwaters along the coast surrounded by thick groves of coconut palms, are some of the features of the country. The mountains of Travancore vary very widely in elevation. Anamudi Peak, which is 8,837 ft. above sea level, is the highest in India next to the Himalayas. The high range which forms the north-eastern portion of the country, and which is practically the home of tea cultivation in Travancore, is a fertile tract studded with mountains ranging from 5,000 ft. to 8,000 ft. above sea level. Further south is the cardamom area, with an elevation of 2,000 ft. to 3,500 ft., covered over by thick virgin forests intermingled with cardamom cultivation. Extending from the cardamom tract southwards along the eastern boundary lies the continuation of the Western Ghats. It is on these hills and on the valleys between them that tea and rubber are being extensively cultivated. From the foot of the hills the country gradually slopes towards the west, its evenness being broken by low hills and valleys. The valleys are occupied by rice flats and coconut groves, and the hills are cultivated with different varieties of edible roots, tubers, spices, pulses and other crops. The coastal area, to a width of about 5 to 10 miles, is quite flat, and is divided into two strips by a succession of backwaters connected by navigable canals. Coconut palm and rice are the two chief crops cultivated in this tract.

Rainfall.

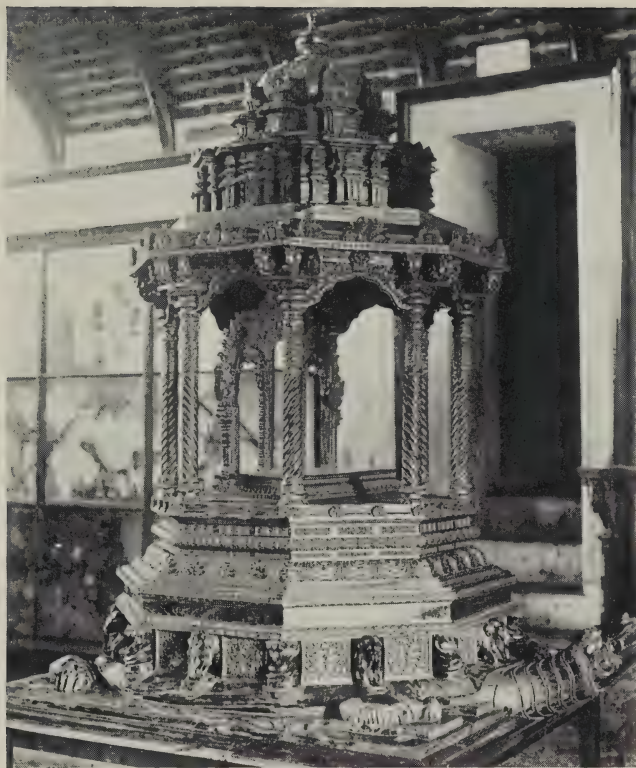
The annual rainfall ranges from 25 ins. up to as much as 200 ins., the average for 75 stations being about 90 ins. It is lowest in the extreme south, and rises gradually towards the north, and also from the west towards the east.

Agricultural.

Travancore is pre-eminently an agricultural country. More than 50 per cent. of the population depend almost exclusively upon land for their means of livelihood. A feature peculiar to the agriculture of the country is that the landlords and tenants of the land live on the land itself. They have their houses on the holdings and live there from generation to generation, looking after the cultivation themselves.

Principal Crops.

Of the different crops cultivated in the State rice occupies the largest area. This is the staple food grain of the country. The whole output is consumed locally, and, besides, a fairly large quantity of rice is imported annually from Burma. A comparatively small portion of the coconut products is consumed locally, but the bulk is exported to foreign countries. Tapioca (Cassava) is the chief foodstuff of the poorer classes of people. A small portion



Specimen of Antique Woodcarving.



Making Lace.



Spinning Coir Yarn.



Weaving Coco Matting.

of the output is exported to other parts of India. Its cultivation can be extended considerably provided there is a market for it outside India. Rubber, tea, pepper, ginger and cardamom are cultivated mostly for export.

Exports.

It is worthy of note that out of the total export trade, amounting to nearly £5,000,000 sterling, the produce of the coconut palm alone accounts for more than £2,000,000.

Coconut.

The figures of export given above show clearly the importance of the coconut palm to Travancore. It is cultivated on the coastal area and on the plains and valleys, especially on the banks of rivers, canals and backwaters.

Coconut, after it is harvested, is husked and cut into two horizontally. The cut halves are exposed to the sun for a day, and thereafter the kernel is separated from the shell and cut into pieces, which are again exposed to the sun until they are quite dry. This dried kernel is the "copra" of commerce. Copra can also be prepared by smoking the kernel or by blowing hot air over it. Sun-dried copra produces the best oil, and hence fetches the highest price. In Travancore artificial drying is seldom resorted to.

Oil is expressed from copra by mechanical contrivances. It is sorted into three grades known as "Office White," "Bazaar White" and "Dark." "Office White" oil is semi-transparent, and possesses the peculiar nutty flavour characteristic of coconut oil, and is obtained from the best white variety of copra. "Bazaar White" oil is obtained from dark brown copra, and the "Dark" oil is recovered from the sediment which is found in the casks after the clear oil has been drawn off. In India coconut oil is used largely for culinary and toilet purposes. Pure oil is a good substitute for butter, and is extensively employed in the manufacture of margarine and coconut butter. It is also one of the important oils used in the manufacture of soaps and candles. The residue that is left behind, after oil is expressed from copra, is coconut cake, which is a valuable food for cattle, sheep and poultry.

The thick outer covering of the coconut known as the "husk" yields a fibre of great commercial value. The husk is soaked in brackish water for about six months and the fibre separated by beating with a flail. The fibre is spun by hand into yarn, and this is the well-known "coir yarn" out of which cocoa mats and mattings are made.

The products of the coconut palm mentioned above, such as nuts of different varieties, copra, oil, cake, fibre, yarn, etc., can be seen at the Travancore Court. From the quality and variety of the articles exhibited one can easily understand why Travancore takes one of the foremost places in supplying the world's markets with the various products of the coconut palm.

Tea.

Next to the coconut palm tea is the most important commercial crop of Travancore. It occupies an area of about 48,000 acres. The quantity exported during the year 1921-22 was 20,250,000 pounds roughly, valued at Rs. 127 lakhs.

Tea thrives best in a warm, moist and comparatively equable climate, where rains are copious and frequent. These conditions are met with over a large portion of Travancore. Elevation is an important factor influencing the yield and quality of tea. At higher elevations the quality is better, but

the yield is less, and at lower elevations the contrary is the case. Several tea estates have been opened on the plains recently, and there is room for several more.

Rubber.

The Para rubber tree stands out as being pre-eminently suited for the commercial production of rubber of the highest quality, and in virtue of its demonstrated superiority has been planted more than any other rubber tree in the East. It is this species of rubber which has been planted in all the plantations of Travancore.

The first plantation of rubber in Travancore was made by the Government on the banks of the Periyar River in the year 1899. The extension of rubber cultivation proceeded rapidly till the outbreak of the war in 1914, and since then somewhat slowly till about 1920, when the low price of rubber threatened the extinction of the industry. Since 1920 there has been practically no further extension of cultivation. The area under rubber at present is about 52,000 acres. Lands suitable for rubber cultivation are still available in Travancore, and a rise in the price of rubber is sure to bring more lands under cultivation.

The raw rubber placed on the market falls into three types, viz., "Smoked Sheet," "First Latex Crepe" and "Scrap Rubber."

These and several articles made out of them, such as soles, bathroom mats, dish mats, plate mats, etc., are exhibited in the Travancore Court.

Oil Seeds and Oils.

Travancore produces a large variety of oils. The most important of them, viz., coconut, has already been dealt with. Of the remaining ones those that deserve mention are (1) *Sesamum indicum*, (2) *Calophyllum inophyllum*, (3) *Calophyllum wightianum*, (4) *Bassia longifolia*, (5) *Hydnocarpus wighiana*, (6) *Sacrostigma klenii*, (7) *Samadera indica*, (8) *Schleira trijuga*, (9) *Pongamia glabra*, (10) *Axadirachta indica*, (11) *Ricinus communis*, (12) *Anacardium occidentale*. The above are all cultivated on garden lands and their seeds yield oils which, in Travancore, are used mostly as illuminants. The properties of these oils have not yet been fully investigated and their value is practically unknown in foreign markets. At present there is no demand for them outside India, and hence their production is very much limited. It is quite possible that some of them, e.g., *Calophyllum inophyllum*, may be found to be useful for the manufacture of lubricants and for several other purposes. If proper uses could be found for these oils and a demand created for them in foreign markets production in Travancore can certainly be increased. The seeds, and both crude as well as refined oils mentioned above, are exhibited in the Travancore Court.

Spices.

The most important crops under this head which are cultivated in Travancore are pepper, ginger and cardamoms.

Pepper.

Travancore pepper still maintains its reputation in European markets. It is one of the chief commercial crops of the country and occupies an area of about 48,000 acres. The annual export ranges from 5,000 tons to 12,000 tons. The ordinary pepper of commerce is black in colour and is prepared by drying the green berries in the sun. What is known as "White Pepper" is prepared by removing the skin from fresh berries by macerating them in water. Both white pepper and black pepper of different varieties can be seen in the Travancore Court.

Wood Carving.

A temple car which is more than 100 years old and a carved cabinet made of different species of wood, both of which are exhibited in the Travancore Court, will show what the country is capable of producing in wood carving.

Silver and Brass Wares.

A large collection of articles of different designs and exquisite workmanship ranging from brooches and tea-spoons to mirror-stands and dinner-gongs are exhibited. The silver articles are made of a tiny silver coin (Chukram) which was current in Travancore till about 20 years ago and was equivalent to about half a penny. Their utility combined with their artistic value cannot but make them attractive and interesting to visitors.

Ginger.

Is cultivated in about 20,000 acres in Travancore. Most of the produce is exported to foreign countries. Ginger is dried in the sun either as such or after the skin has been removed, and is sold in markets as "unscraped" or "scraped" ginger respectively.

Cardamoms.

Green cardamoms, after they are plucked, are either dried in the sun or in special drying houses. Some planters bleach the dried cardamoms with sulphur fumes. Both bleached and unbleached cardamoms are sold in European markets. The former fetch a better price on account of their colour, though in quality they are in no way superior to the other. The average yield per acre ranges from 200 lbs. to 500 lbs. There are about 50,000 acres under cardamom in Travancore, and about 6,500 tons were exported in the year 1921-22.

Farinaceous Food Crops.

Several edible roots and tubers and other plants from which flours and starches can be made are cultivated in Travancore. Cassava, arrowroot, sweet potato, and different kinds of yams are the chief among these.

They are at present consumed almost entirely by the people of the country. They are either cooked when fresh, or are dried and preserved to fall back upon in times of scarcity. Cassava is the most widely cultivated of all the root crops.

Flours and starches can be prepared from all the edible roots and tubers and also from the fruits of a tree, known as *Cycas circinalis*, which grows wild in the country, and from the pith of a palm known as *Corypha umbraculifera*.

All these flours and starches and samples of the materials from which they have been prepared are exhibited in the Travancore Court.

Essential Oils.

A large portion of the "East Indian Lemon Grass Oil" or "Cochin Lemon Grass Oil" exported to Europe comes from Travancore. This oil is obtained by distillation with steam from the upper third of *Cymbopogon flexuosus*, Stapf, a grass which formerly only grew wild but is now cultivated on the foot hills of the Western Ghats, in Central and North Travancore. This oil is soluble in two to three times its volume of 70 per cent. alcohol, and is thus distinguished from the inferior oil obtained from *Cymbopogon citratus*, Stapf, which is insoluble in 70 per cent. alcohol. About 25,000 lbs. of Lemongrass oil are exported annually from Travancore. In the Travancore Court are exhibited samples of this oil as well as of other essential oils obtained from *Cymbopogon Coecius*, Stapf, *Calamintha umbrosa*, Benth, *Zingiber Officinalis* (Ginger) and Black Dammar (Resin from *Canarium strictum*). The properties of these oils are being investigated by the Department of Industries. There are possibilities for producing them on a commercial scale in Travancore.

Forest Products.

More than 30 per cent. of the area of Travancore is Reserved Forest which contains over 500 species of timber trees and 3,500 species of other plants, some of which are of great economical and commercial value. The yield of timber from the forests of the State averages about 800,000 c. ft. per annum, of which about 300,000 c. ft. consist of teak (*Tectona grandis*) and Rosewood (*Dalbergia latifolia*). The timber brings in a revenue of about £90,000 annually to the State.

Timber specimens of 170 specimens in book form, showing their grain, colour and medullary plates, are arranged in two revolving book cases made of Rosewood. A Rosewood plank 14 ft. 7 ins. by 3 ft. 7 ins. by 1½ ins., planed and polished, and also panels made of *Terminalia mentosa*, *Adina cordifolia*, *Tectona grandis*, *Dalbergia latifolia* and *Dysoxybium malabaricum* are also exhibited. Other exhibits of forest products consist of 18 varieties of tanning materials, 15 dye stuffs, 47 medicinal products, 9 oil seeds and oils, 13 gums and resins and 43 fibres.

Coir Industry.

The preparation of fibre from the husk or outer covering of the coconut and its conversion into yarn is a thriving cottage industry in Travancore, especially among the people inhabiting the coastal area. The husk is steeped in brackish water where it remains buried for several months until it softens sufficiently to be beaten out, so as to separate the fibre from the pith and skin. Coir fibre in its natural state is utilised for stuffing purposes for upholstery, mattresses, etc. For some of these purposes it is occasionally dyed. In its natural and dyed conditions it is made into fancy door mats with many and varied patterns. The greater quantity of fibre produced is utilised for the spinning of coir yarn. This is of many descriptions and known to commerce usually by the name of the locality in which it is produced. They vary slightly according to local conditions and the methods of preparation and spinning. A large export trade is done in the various grades of coir yarn.

Samples of mats and matting are exhibited in the Travancore Court.

Lace Industry.

Lace making was first introduced as a cottage industry among the Christian fisherwomen in South Travancore. It has now been taken up by various other classes of people in different parts of the country, so much so that it has become one of the flourishing cottage industries of the State. Travancore lace has gained a wide reputation and won medals at various Exhibitions held in Europe. Some specimens of it were reported to be as good as the best French lace. A very large collection of laces of different sorts and varied patterns is displayed in the Travancore Court.

Ivory Carving.

The art of carving has been known to Travancore for a very long time. A high degree of skill and perfection has been attained in stone carving, wood carving and particularly in ivory carving which was specially patronised by successive Rulers of the Country. In 1872 a special department of ivory carving was organised by Government. It existed for 15 years, when it was incorporated with the School of Arts at Trivandrum where this work is still being carried on. Some of the specimens of carving in ivory executed in Travancore are perhaps the finest that have ever been made in India. A large number of such specimens made in the School of Arts and by private firms in Trivandrum are exhibited in the Travancore Court, and these form one of the most attractive features of the Court.

Food Products.

| Articles Exhibited. | Name and Address of Exhibitors. |
|---|---|
| FARINACEOUS PRODUCTS— | |
| Specimens preserved in formalin and dried chips of banana, sweet potato, tapioca, (cassava), arrowroot, yams, cycas, pith of talipot, palm, etc., flours and starches made out of the above | Department of Agriculture, Travancore. |
| PRESERVED FISH, VEGETABLES AND FRUITS— | |
| Light cured prawns, pineapple, jack fruit and ginger in syrup, nutmeg pickle, banana figs, candid cashewnut, etc. | Department of Agriculture & Fisheries, Travancore. |
| CONDIMENTS AND RELISHES— | |
| Different varieties of pepper, ginger, turmeric and cardamons (bleached and unbleached) | Department of Agriculture, Travancore. |
| MISCELLANEOUS BEVERAGES— | |
| Tea (Pekoe, Orange Pekoe, Broken Pekoe and P. Fannings) | Kannan Devan Hills Produce Co., Ltd., Munnar, Travancore. |

Raw Materials.

| | |
|---|---|
| MINERALS— | |
| Monazite and its products | The Travancore Minerals Co., Ltd., Muttam, S. Travancore. |
| Pyrrhotite and garnet sand | Messrs. Alexander & Co., Colachel, Travancore. |
| TIMBER AND OTHER FOREST PRODUCTS— | |
| Panels made of teak, rosewood, laurel wood (Terminalia, tomentosa), Adina cordifolia and Dysoxylum malabaricum | Forest Department, Travancore. |
| Rosewood plank, 14 ft. 7 ins. × 43 ins. × 1½ ins. | K. V. Joseph, Changancherry, Travancore. |
| Specimens of 170 species of timber in book form, arranged in revolving book shelves | Forest Dept., Travancore. |
| <i>(Note.—A detailed list of Travancore timbers with their uses can be had at the stall).</i> | |
| 18 varieties of tanning materials, 37 dye-stuffs, 47 medicinal products, 9 oil seeds and oils, 13 gums and resins, 39 fibres, 1 piece of bark of Antiaris toxicaria, and 1 model of a forest rest house | Forest Dept., Travancore. |

TEXTILE PLANTS—

| | |
|---|--|
| Cotton, kappas and ginned, and 32 varieties of fibres | Department of Agriculture, Travancore. |
|---|--|

Raw Materials—*contd.*

| Articles Exhibited. | Name and Address of Exhibitors. |
|--|---|
| RUBBER, OIL PRODUCING AND PLANTS USED FOR INDUSTRIAL PURPOSES— | |
| Rubber sheets and crepes, soles, bath-room mats, dish mats and plate mats, made of rubber | Red Lynch and Nemmeny Estates, Mundakayam, Travancore. |
| Rubber sheets | P. John, Kottayam, Travancore. |
| Cocoanuts of different varieties, copra and coconut oil | Department of Agriculture, Travancore, and P. John, Kottayam, Travancore. |
| Oil seeds and oils, crude as well as refined, of <i>Calophyllum inophyllum</i> , <i>C. Wightiana</i> , <i>Bassia latifolia</i> , <i>Samadera indica</i> , <i>Anacardium occidentale</i> , <i>Autocarpus hirsuta</i> , <i>Melia azadireachta</i> , <i>Hydrocarpus wightiana</i> , <i>Sacrostigma Klenii</i> , <i>Schleichera trijuga</i> , <i>Pongamia glabra</i> , <i>Sesamum indicum</i> , etc. | Department of Agriculture, Travancore. |

Textiles.

COTTON FABRICS—

| | |
|---|--|
| Laced cloths, towels, table covers, etc. .. | 1. C. Padmanabha Pillai, Cloth Merchant, Trivandrum. 2. Swadesi Cloth Depot, Eraniel. 3. Arya Naithusala, Eraniel 4. Meenakshi Ammal, Kottar. |
|---|--|

PLANTAIN FIBRE CLOTH—

S.M.V.R. Institute, Nagercoil, Travancore.

COIR YARN AND FABRICS—

| | |
|---|--|
| Coir mattings, door mats, rugs, etc. .. | 1. Messrs. Darragh, Smail & Co., Ltd., Alleppy. 2. Messrs. William Goodacre & Sons, Ltd., Alleppy. 3. M.L. Janardanam Pillai, Alleppy. 4. S. K. V. I. Institute, Paravur, Travancore. |
|---|--|

ALOE YARN AND FABRICS—

| | |
|---|--|
| Aloe fibre, canvas, market bag, matting, etc. | 1. S. K. V. I. Institute, Paravur. 2. J. H. Vavas seur & Co., Ltd., Colachel, Travancore. |
|---|--|

PALMYRAH FIBRE, BRUSHES, ETC.

J. H. Vavas seur & Co., Ltd., Colachel, Travancore.

Textiles—*contd.*

| Articles Exhibited. | Name and Address of Exhibitors. |
|---|--|
| LACE, EMPROIDERY AND TRIMMINGS— | |
| Gold embroidered white chausible .. | St. Thomas Industrial School, Changanacherry, Travancore. |
| Pillow lace, crochet lace, duchesse lace, Carrickmacross lace, Bruges lace, Limerick lace, bed-spreads, d'oyleys, camisoles, tea-cloths, table centres, handkerchiefs, motifs, insertions, edgings, nightdresses, babies' frocks, cosy covers, bridal kerchiefs, scarfs, evening dress pieces, etc. | <ol style="list-style-type: none"> 1. London Missionary Society Lace Industry, Nagercoil. 2. Salvation Army Industries, Nagercoil. 3. London Missionary Society Embroidery Industry, Neyyoor. 4. Parachalley District Embroidery Industry, Parachalley, Travancore. 5. St. Joseph's Convent, Alleppy. 6. Holy Angel's Convent, Trivandrum. London Missionary Society Embroidery Industry, Trivandrum. 8. Infant Jesus Orphanage, Mulagumudar. 9. J. Lernos, Trivandrum. 10. Mrs. Jacob, Trivandrum. 11. Miss J. Gonzaga, Quilon. 12. Mrs. J. B. D'Cruz, Trivandrum. 13. J. Elias, Lace Merchant, Quilon. 14. A. P. Fernandez & Sons, Eraviperur, Quilon. |
| MISCELLANEOUS TRADES— | |
| Mats, bags, eyeglass cases, etc., made of screwpine leaves (<i>Pandanus fascicularis</i>) | Kochupennu Valumpi, Thazhava, Karunagapally, Travancore. |

Leather Industries.

BOOTS AND SHOES—

| | |
|------------------------------|-----------------------------------|
| Shaddocks (slippers) | Paris Bazaar, Quilon, Travancore. |
|------------------------------|-----------------------------------|

Chemical Industries.

DYES—

| | |
|--|---------------------------------------|
| Archil, Orcein and Wild Turmeric (dye stuffs). Samples of silk dyed with Archil dye. | Department of Industries, Travancore. |
|--|---------------------------------------|

PERFUMERY—

| | |
|--|--------------------------------------|
| Essential oils of lemon grass, black dammar, ginger, cuscus, suchi grass | Department of Industries Travancore. |
|--|--------------------------------------|

Chemical Industries.—*contd.*

| Articles Exhibited. | Name and Address of Exhibitors. |
|---|---|
| PAPER— Pulp from gunn rags and reeds and paper, white and coloured. | The Meenakshi Paper Mills, Punalur, Travancore. |

Goldsmiths' Work.

SILVER WARE—

| | |
|---|--------------------------------------|
| Trays, rose bowls, flower stands, fruit and egg dishes, sugar pots, jam pots, salt cellars, toast racks, serviette rings, sugar tongs, tea spoons, muff chains, brooches, mirror stands, dinner gongs, pendants, safety pins, etc., etc., made of silver. | M. Krishna Sait, Quilon, Travancore. |
|---|--------------------------------------|

Miscellaneous Industries.

BELL METAL AND BRONZE WARE—

| | |
|---|---|
| Lamps, jugs, oil cups, betel trays, metallic mirrors, fern pots, flower vases, flower dishes, hand bells, candle stands, etc., etc. | 1. Government Museum, Trivandrum. 2. The Viswakarma Co-operative Society, Mannar, Travancore. 3. Nilakantan Asari, Karunagapally, Travancore. |
|---|---|

BUTTONS—

| | |
|---|---------------------------------------|
| Buttons made of cocoanut shells, horns, bones, etc. | L. A. Netto, Valiathorai, Trivandrum. |
|---|---------------------------------------|

BASKET WORK—

| | |
|---|---|
| Flower baskets and trays made of rattan | 1. N. P. Janardhana Rao, Varkalai, Travancore. 2. S.K.V.I. Institute, Paravur, Travancore. |
|---|---|

FANCY GOODS—

| | |
|---|---|
| Shanks, plain and carved, bangles and rings made of shank shell | 1. Department of Fisheries, Travancore. 2. L. A. Netto, Valiathorai, Trivandrum. |
|---|---|

MODELS AND TOYS—

| | |
|--|---|
| Model of a Malabar house | Government Museum, Trivandrum |
| Model of a fly shuttle loom | Pitchandy Maistry, Kottar, Travancore. |
| Models of Hindu temples | 1. Government Museum, Trivandrum. 2. Konthi Sankaran, Pallam, Kottayam, Travancore. |
| Models of a cabin boat, fishing boat, and snake boat | 1. School of Arts, Trivandrum. 2. Nilakantan Asari, Kada-kavur, Chirayinkil, Travancore. |

Miscellaneous Industries.—*contd.*

| Articles Exhibited. | Name and Address of Exhibitors. |
|---|---|
| MODELS AND TOYS —<i>contd.</i> | |
| Models of bullock cart, and horse carriage ; toys representing cocoanut industry, toddy drawing, jaggery making, cultivation of rice, saving timber, weaving, milling, copra, carpentry, goldsmiths' work, etc., etc. | Nilakantan Asari, Kadalakavur, Chirayinkil, Travancore. |

Decoration and Furniture.

FURNITURE—

| | |
|---|--|
| Cocoanut and palmyrah wood chairs and teapots | P.W.D. Workshops, Trivandrum. |
| Rosewood box with secret drawers .. | Government Museum, Trivandrum. |
| Rosewood attaché box, jewellery case and tea tray | Travancore Timber Trust, Ltd., Kottayam, Travancore. |
| Round table in ebony | D'Netto Bros., Barton Hill, Trivandrum. |

Original Objects of Art.

WOOD CARVING—

| | |
|---|--------------------------------|
| Carved cabinet of different species of wood | School of Arts, Trivandrum. |
| Temple car | Government Museum, Trivandrum. |

IVORY CARVING—

| | |
|--|--|
| Dinner gong mounted on elephant tusks, tankards, card cases, cruet stand, mirror back, paper cutters, brush back, paper weights, combs, cigar box, umbrella handle, trinket box, hat pins, cigarette holders, chessmen and chess board, photo frames, sleeve bangles, lady on swing, flower vases, glove stretchers, serviette rings, bead strings, shoe horns, walking sticks, etc., etc. | 1. School of Arts, Trivandrum. 2. Messrs. P. S. Iyer & Co., Trivandrum. |
| Human skeleton in ivory | Government Museum, Trivandrum. |

KOFTGARI WORK.—

| | |
|---|-----------------------------|
| Trays, photo frames, paper weights, cups, boxes, brooches, etc. | School of Arts, Trivandrum. |
|---|-----------------------------|

INLAID WORK—

| | |
|--|--|
| Hall stand inlaid with ivory, ebony chair inlaid with ivory, triangular ebony table, teapots, etc. | School of Arts, Trivandrum. Messrs. P. S. Iyer & Co., Trivandrum. |
| Teapots, tea trays, photo frames, sandal wood boxes, cocoanut shell cups, walking sticks, etc. | Messrs. P. S. Iyer & Co., Trivandrum. |
| Walking stick made of 12,000 pieces of horns, ivory, mother-o'-pearl, shells, etc. | M. V. Pampazi & Sons, Shertallay, Travancore. |

List of Exhibitors in the Travancore Court.

| Name and Address of Exhibitors. | Articles Exhibited. |
|---|---|
| Agricultural Department, Travancore .. | Agricultural Products and Preserved fruits. |
| Alexander & Co., Colochel, South Travancore | Minerals. |
| A. P. Fernandex & Sons, Eraviperur, Quilon, Travancore. | Lace. |
| Ayra Naithasula, Eraniel, S. Travancore .. | Laced cloths. |
| Darragh Smail & Co., Ltd., Alleppey, Travancore | Cocoa mattings, door mats, etc. |
| D'Cruz, J. B. (Mrs.), Trivandrum | Lace. |
| Elias, J., Lace Merchant, Quilon | Do. |
| Forest Department, Travancore | Forest products. |
| Gonzaga, J. (Miss), Quilon, Travancore .. | Lace. |
| Government Museum, Trivandrum | Models, bell metal and brass wares. |
| Holy Angel's Convent, Trivandrum | Lace. |
| Industries Department, Travancore | Dyes and essential oils. |
| Infant Jesus Orphanage, Mulagumudu, South Travancore | Lace. |
| Jacob, J. C. Mrs.), Trivandrum | Do. |
| Janardhanan Pillai, M. L., Alleppey, Travancore | Cocoa matting, door mats, etc. |
| Janardhana Rao, P., Varkalai, Travancore.. | Rattan trays, etc. |
| John, P., Kottayam, Travancore | Rubber and cocoanut. |
| Joseph, K. V., Changanacherry, Travancore | Rosewood. |
| Kannan Devan Hills Produce Co., Ltd., Munnar, Travancore | Tea. |
| Kochupennu Velumpi, Thashava, Karunagapally, Travancore | Screwpine mats. |
| Konithi Sankaran, Pallam, Kottayam, Travancore. | Models. |
| Krishna Sait, M., Quilon, Travancore | Silver ware. |
| Lemos, J. (Mrs.), Trivandrum | Lace. |
| London Missionary Society Lace Industry, Nagercoil, Travancore | Do. |
| London Missionary Society Embroidery Industry, Neyyoor, S. Travancore | Do. |
| London Missionary Society Embroidery Industry, Neyyoor, Trivandrum | Do. |
| Meenakshi Ammal, Kottar, Nagercoil, South Travancore | Lace cloths. |
| Meenakshi Paper Mills, Punalur, Travancore | Paper. |
| D'Netto Bros., Barton Hill, Trivandrum .. | Furniture. |
| Netto, L. A., Valiathorai, Trivandrum .. | Buttons. |
| Nilakantan Asari, Kadakavur, Chirayinkil, Travancore | Toys. |
| Nilakantan Asari, Karunagapally, Travancore | Bell metal articles. |
| Padmanabha Pillai, C., Cloth merchant, Kaithamukku, Trivandrum | Lace cloths. |
| Parachalay District Embroidery Society, Parassalai, South Travancore | Lace. |
| Paris Bazaar, Quilon, Travancore | Shoes. |
| Pitchandy Maistry, Kottar, South Travancore | Model of fly shuttle loom. |
| Pompazi & Sons, Shertalley, Travancore .. | Walking stick. |

List of Exhibitors in the Travancore Court—*contd.*

| Name and Address of Exhibitors. | Articles Exhibited. |
|--|--|
| P. S. Iyer & Co., Sreekanteswaram, Trivandrum | Ivorywork. |
| P. W. D. Workshops, Trivandrum | Furniture. |
| Red Lynch and Nenmeny Estates, Munda- kayam, Travancore | Rubber. |
| Salvation Army Industries, Nagercoil, South Travancore | Lace. |
| School of Arts, Trivandrum | Ivory, koftgari and inlaid works, carved furniture. |
| S.K.V.I. Institute, Paravur, Travancore .. | Cocoa matting, door mats, etc. |
| S.M.R.V. Institute, Nagercoil, Travancore .. | Plantain fibre cloth. |
| St. Joseph's Convent, Alleppey, Travancore | Lace. |
| St. Thomas Industrial School, Changan- cherry, Travancore | Embroidery. |
| Swadhesi Cloth Merchant, Eraniel, South Travancore | Lace cloths. |
| Travancore Minerals Co., Ltd., Muttam, South Travancore | Monazite. |
| Travancore Timber Trust, Ltd., Kottayam, Travancore | Furniture. |
| J. H. Vavas seur & Co., Ltd., Colochel, South Travancore | Palmyrah and aloe fibres and fabrics. |
| Viswakarma Co-operative Society, Mannar, Travancore | Bell metal articles. |
| William Goodacre & Sons, Ltd., Alleppey, Travancore | Cocoa matting, door mats, etc. |

P. & O. and B.I.S.N. Co.

THE exhibit of the P. & O. and British India Steam Navigation Companies will be found at the southern entrance to the Madras Court, housed beneath a pavilion, in the design of which palm trees and palm leaves are the chief motif. The pavilion, oblong in shape, is finished with an ornate frieze, each face bearing centrally, on a medallion, the Companies' arms.

The Exhibit consists of models of new P. & O. steamships assigned to that Company's India or Australia mail and passenger services, and a model of the British India Company's steamship "Tairea" intended for that Company's passenger line between Calcutta and China. While the models number only four, they represent no less than twelve vessels, each being one of a group of sister ships. Short particulars of the vessels follow:—

| | |
|--|--|
| "MOOLTAN" (with "Maloja" the sister ship.) | Length (B.P.), 600 ft. Breadth (moulded), 73 ft. Depth (keel to beam), 44 ft. Gross tonnage, 20,800 tons. Net tonnage, 12,750 tons. I.H.P., 16,000. "Mooltan" and "Maloja" built and engined by Harland & Wolff, Ltd., 1922. |
| 'CATHAY" (with "Comorin" and "Chitral," sister ships.) | Length, 545 ft. Breadth, 70 ft. Depth (keel to beam), 46 ft. Gross tonnage, 15,000 tons. I.H.P., 11,000. Built and engined— "Cathay" and "Comorin," by Barclay & Curle. "Chitral," by Alex. Stephen & Sons. |
| "TAIREA" (with "Takliwa" and "Talama" sister ships.) | Length, 465 ft. Breadth, 60 ft. Depth (keel to beam), 41 ft. Gross tonnage, 8,350 tons. I.H.P., 7,700. Built and engined— "Tairea" and "Takliwa" by Barclay, Curle & Co. "Talama," by Hawthorn, Leslie & Co. |
| "RAWALPINDI" (with "Rajputana," "Ranpura" and "Ranchi" (sister ships.) | Length (B.P.), 547 ft. Breadth (moulded), 71 ft. Depth (keel to beam), 38 ft. 6 ins. Gross tonnage, 16,100 tons. Net tonnage, 9,650. I.H.P., 15,000. Built and engined— "Rawalpindi" and "Rajputana" by Harland & Wolff, Ltd. "Ranpura" and "Ranchi" by Hawthorn, Leslie & Co., Ltd. |

The chief passenger and freight services maintained by the P. & O. Company are : weekly by mail steamers from London to Marseilles and from London and Marseilles to Gibraltar, Egypt, Aden and Bombay ; fortnightly by mail steamer direct from London (with connection via Marseilles) to Straits, China and Japan ; every four weeks by mail steamers from London and Marseilles to Ceylon, Australia and New Zealand ; fortnightly by intermeditae steamers from London to Ceylon and Calcutta. And *vice versa*.

The British India Steam Navigation Company maintains frequent and regular passenger and freight services between London and ports in Egypt, India, Australia, East and South Africa ; and between ports in India and the Persian Gulf, East and South Africa, Australia, China and Japan.

The tickets of the P. & O., British India and Orient Companies, of the New Zealand Shipping Company and the Union Steam Ship Company of New Zealand are interchangeable.

Chief Passenger Office (F. H. Grosvenor, Manager) : P. & O. and British India Companies, P. & O. House, 14 Cockspur Street, London, S.W.1.

Freight and General Business : 122 Leadenhall Street, E.C.3.

B.I. Agents : Gray, Dawes & Co., 122 Leadenhall Street, E.C.3.

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